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# COMMERCIAL FISHERIES REVIEW



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APRIL 1955

FISH and WILDLIFE SERVICE  
United States Department of the Interior  
Washington, D.C.



# COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries  
prepared in the BRANCH OF COMMERCIAL FISHERIES



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Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C.

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## USE OF UNDERWATER TELEVISION IN FISHING-GEAR RESEARCH (PRELIMINARY REPORT)

By Reidar F. Sand\*

### BACKGROUND

Direct observation of a midwater trawl net in operation was a joint field project conducted by the U. S. Fish and Wildlife Service and the U. S. Navy's Bureau of Ships in early November 1954. This was the first practical demonstration in this country of the application of underwater television as a research tool for experimental work in fishery methods and equipment.

Dubbed operation "Fish-eye" by participating members of the field party, the television broadcast in the clearer Gulf Stream waters off the east coast of Florida was carried out cooperatively by personnel from the Service's Coral Gables and Pascagoula Stations and the Navy's Bureau of Ships, Washington, D.C. Representatives from the Navy Diving School, the Navy Photo Center, Geological Survey, and the University of Miami Marine Laboratory also participated.

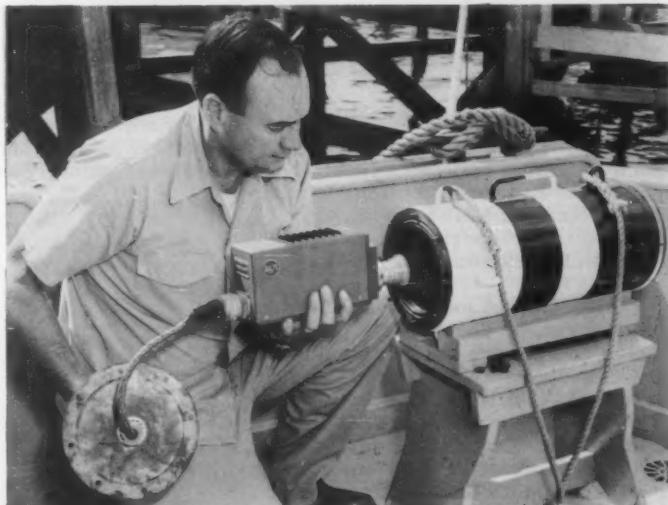


Fig. 1 - The RCA ITV-5 camera unit is inserted into the watertight housing. Camera lens is a Kodak 16 mm, Cine Ektar lens with wide angle adapter.

Research in the field of fishery methods and equipment has been hampered by the limited access to direct observation of fishing gear in operation. Advances in design and construction of nets, trawls, and other gear have come about largely as the result of trial and error, or have been based on scanty information obtainable from work with models, or by information supplied by the efforts of divers working with underwater cameras. With the advent of television into underwater research in other fields, recognition of the possibilities of the adaptation of the instrument as a means of securing direct observation of fishing gear and methods led to the assignment of such a project to the Service's Exploratory and Gear Development Station at Coral Gables, Fla. Here, in cooperation with other agencies at work in the field of underwater television at home and abroad, the gear research unit made preliminary investigations toward the adaptation of a standard vidicon television chain to underwater operation.

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## EQUIPMENT AND METHODS

Over a period of two years many preliminary experiments were made to prepare the television chain for this initial demonstration, as well as to gather basic data useful in the development of television as a general gear research tool. Even though the sensitivity of the television camera is much greater than the human eye,

many mechanical and technical modifications were necessary to utilize the maximum picture potential. Frequent complete checkovers and maintenance repairs resulted from the residual effects of salt air, dampness, and even short periods of inactivity. A separate generating set was installed aboard the Service's 57-foot research vessel Pompano to provide an adequate 110-volt a.c. power supply for the television chain. In addition to the sync-pulse generator built into the chain, an auxiliary unit was often necessary to stabilize picture quality under field conditions.



Fig. 2 - Complete TV chain used in these experiments. Left to right: watertight housing, TV camera, multiconductor cable, control monitor.

multiconductor cable to a remote control monitor aboard the research vessel. In this manner the camera becomes a sort of remote eye under the operator's control. Such a system can conceivably be operated at much greater depths than a diver can withstand and for much longer periods of time without the risk attendant to a diver operating an ordinary underwater camera.

By comparison of available data on underwater photography procedures and progressive experimental UW-TV operations, optimum and favorable conditions for the use of UW-TV in gear research were investigated. Considerations of the critical angle of sunlight and various surface conditions suggested more favorable results could be expected with a slight ripple on the water than in a flat calm. In the clearer waters such as those of the Gulf Stream off Florida, as much as 50 percent natural sunlight could be expected at depths to 25 feet. A period from 9:00 in the morning to 3:00 in the afternoon, with favorable atmospheric and hydroscopic conditions, was found to be optimum for work with the vidicon television system. Effectiveness of the television camera may be sharply reduced by molecular diffusion of light or by suspensions of organic and inorganic matter in the water. This may be some-



Fig. 3 - Early experimental mounting of TV housing on submersible sled. Camera set for side viewing.

what offset through the use of water contact lenses. At depths in excess of 30 to 40 feet, where color tends to go to shades of blue and green, white or yellow indicated the greatest persistence for visual observation of trolled lures, otter boards, and trawl nets. Due to the refraction of light, lens coverage was reduced by approximately 25 percent while the camera submerged. The use of a wide-angle lens afforded greater facility in viewing, with a minimum blurring of image, in most instances over limited distances.

Various methods of approach were investigated to find suitable simple mechanical appreciations of the existing equipment for the study of the particular problem mentioned above and for basic gear research as well. Early experiments were

conducted by simply lowering the camera housing overside to depths of 40 feet. The addition of metal or wooden fins or rudders to the watertight housing allowed it to be towed at speeds up to 3 and 4 knots while submerged. By mounting the camera in a

fixed position on a submersible sled with directional or stabilizing chains, a towed object could be viewed at comparable speeds. The speed of the vessel and the setting of vertical and horizontal stabilizers on the sled controlled the distance and attitude of the vessel to the camera, and the camera to the object. In this manner a towed net might be viewed from the front, the top, or laterally at different angles. An alternate simple arrangement for observation of trawl nets was affixing the camera housing to a trolley and lowering it down the length of the towing warp. By this means good front views were obtained



Fig. 4 - TV camera housing is adjusted on a submersible sled for downward viewing. Vertical and horizontal stabilizers can be preset.



Fig. 5 - Camera housing mounted on sled for rear viewing.

of trolled lures, trawl nets, and otter boards at depths to 40 feet.

### EXPERIMENTAL RESULTS

During a joint cruise (November 1-15, 1954), the UW-TV equipment was used to observe and photographically record further tests of a modified Swedish "phantom" midwater trawl. The vidicon television chain was employed aboard the Pompano to observe laterally the action of the midwater trawl and accessories, while the trawl was towed by the Service's 100-foot exploratory fishing vessel Oregon. At the same time from the Oregon, an image orthicon camera in a special watertight housing affixed to an experimental submersible was used to view the trawl from the front. Good viewing was obtained at depths in excess of 60 feet, and at distances of more than 60 feet. Both moving picture and still photographs were made of the television observations. A limited amount of work with underwater artificial lighting to improve conditions for television observation was also carried out aboard the Pompano during this period. The use of standard diving lights with reflectors and photofloods afford-

Fig. 6 - Front view of model 20-foot midwater trawl as seen on TV monitor screen aboard M/V Pompano. Trawl doors were painted white with alternating dark stripes for better viewing. Trawl was 20 feet beneath surface, with TV camera approximately 30 feet ahead of trawl mouth.

ed improved illumination to limited distances. Considerable variation has been found in individual reflector lamp ability to withstand pressures in workable ranges. Tests suggested that controlled artificial illumination should afford greater efficiency, but particular physical arrangements of lights and television camera are required for optimum results.

As a result of these experiments, it is indicated that an underwater television chain can successfully be utilized as a means of observing fishing gear in operation. While image orthicon television equipment is certainly desirable from the standpoint of greater sensitivity and definition, it remains a comparatively complex instrument. The picture quality of vidicon television equipment is somewhat less in comparison but should prove to be generally adequate for conditions of limited viewing distances wherever favorable illumination is provided.

### CONSIDERATIONS FOR FUTURE DEVELOPMENT AND USE

The size of any submersible television camera unit is of importance for ease in handling and maneuverability under field conditions. An extremely desirable feature for an underwater television vehicle would be some scanning facility for the cam-

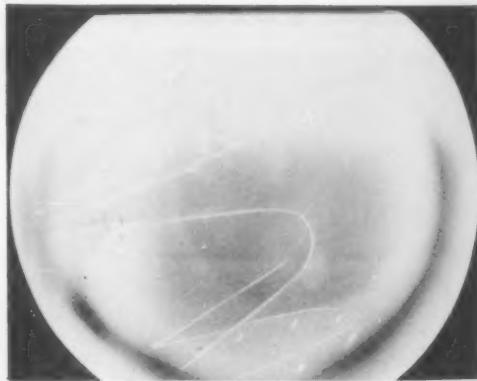
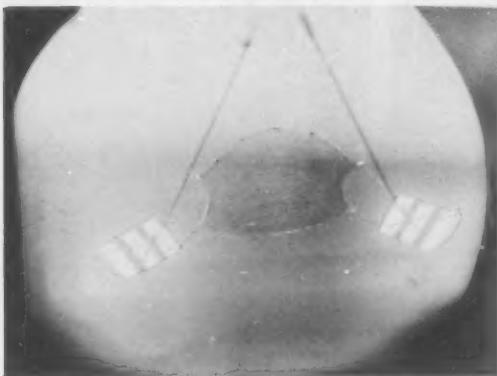


Fig. 7 - Side view of forward part of Swedish "phantom" midwater trawl (modified) as viewed with the TV camera about 40 feet from the trawl, towed at a depth of 60 feet. Top and bottom wings and amount of vertical net opening are shown. White objects attached to head and foot ropes are trawl floats and planes.

era in both azimuth and elevation. The ability of the unit to hover, to be placed on the bottom, or to be propelled at speeds in excess of 3 to 4 knots would also be of great value. The gear research unit at Coral Gables now has under construction a prototype of such a submersible television vehicle which will afford some scanning facility for the camera. An improved remote iris control is also being developed.

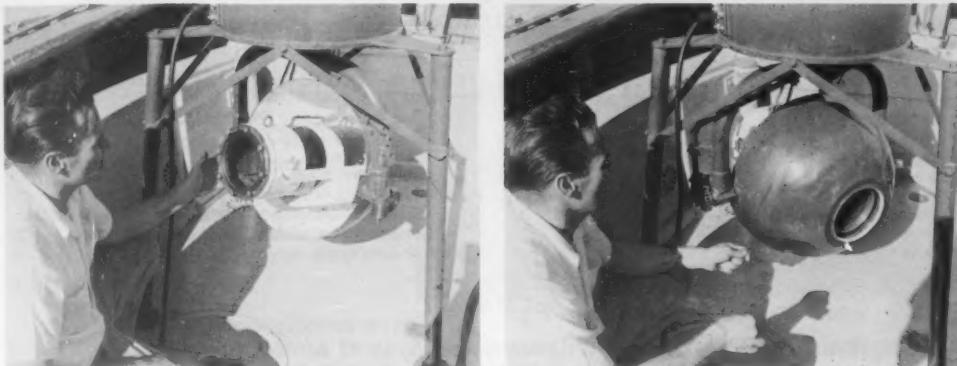


Fig. 8 - Experimental prototype tripod arrangement supporting remotely-controlled submersible power unit, with TV camera pressure cylinder mounted in a spherical free-flooding external housing capable of scanning 360° in azimuth and 90° in elevation. Left: rear view with half of spherical housing removed; right: front view.

The value of UW-TV as an aid to investigations in marine biology and in limnology has been shown. In addition to gear research work in the commercial fisheries, it may prove to be of assistance in the delineation and harvesting of clam beds and of oyster and scallop beds. Closer views might be obtained of bottom types, bottom formations, and of fishes in their natural habitat, which at present may be located only with difficulty by depth-sounding equipment. Water temperatures, current flow, turbidity, and other oceanographic data related to the fisheries might be directly monitored. One might reasonably expect that further experience will expand considerably the scope and variety of possible UW-TV observations. Within the limitations of the "closed" television system, the suitability of the equipment for a particular problem should rest principally on mechanical application.

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## BOTTOM FISH AND SHELLFISH EXPLORATIONS IN THE PRINCE WILLIAM SOUND AREA, ALASKA, 1954

By E. A. Schaefers,\* K. A. Smith,\* and M. R. Greenwood\*

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### SUMMARY

Explorations in the Prince William Sound Area of Alaska for bottom fish and shellfish were conducted by the Service's exploratory fishing vessel John N. Cobb

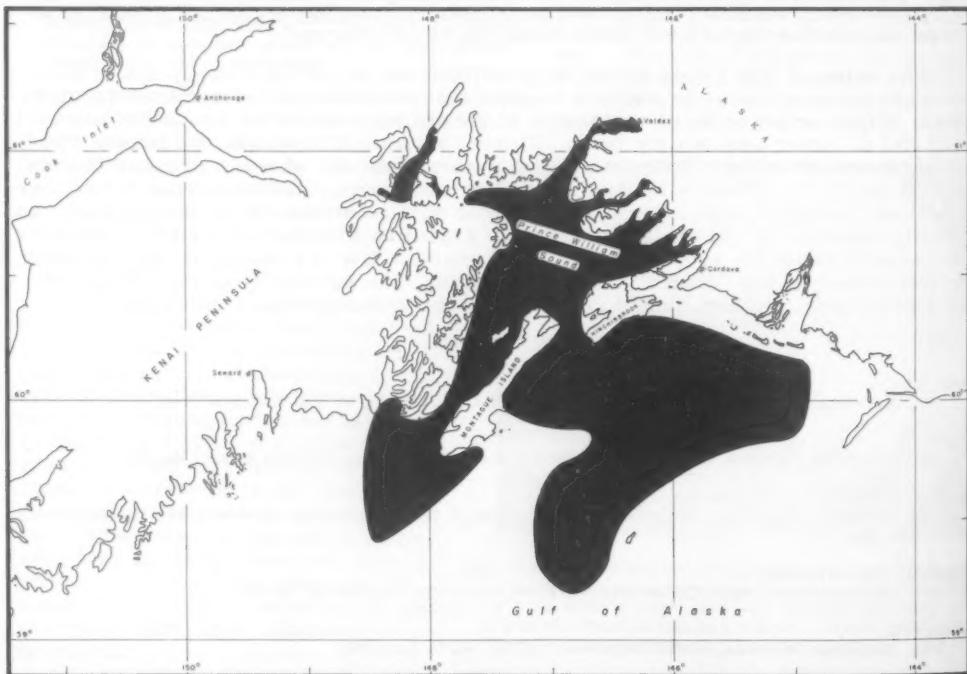


Fig. 1 - Northern Gulf of Alaska. Shaded portion indicates area of fishing operations.

during two periods in 1954. Gear used during the first period (February 26 to April 6) included otter trawls and beam trawls. Gear used during the second period (July 13 to September 8) included otter trawls, beam trawls, king-crab pots, and shrimp traps.

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Commercial quantities of Pacific ocean perch and sablefish were taken in otter-trawl drags in the offshore waters adjacent to Prince William Sound during the second period. The best catches of Pacific ocean perch were made in the vicinity of Middleton Island and south of Point Elrington. The best catches of sablefish were also made south of Point Elrington. Starry flounder were taken in amounts up to 1,800 pounds per drag from near Cape Hinchinbrook to off Cottonwood Point. Otter-trawl drags in Prince William Sound proper during both periods caught only small amounts of commercially-desirable species of bottom fish. King-crab catches were also small.

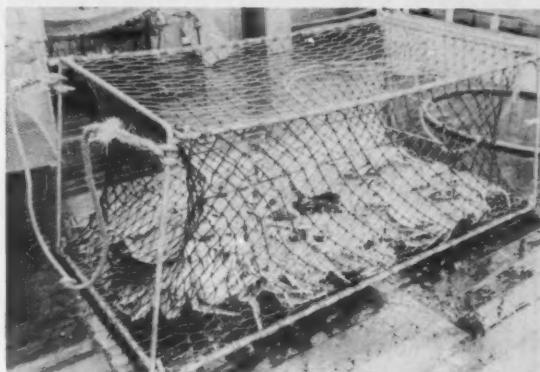


Fig. 2 - Collapsible king-crab pot with catch of crabs.

Favorable shrimp catches were made by beam trawl in Orca Bay, Port Gravina, and Montague Strait during the second period. Only a few shrimp were taken by traps.

The best results with king-crab pots were obtained in College Fiord and Esther Passage.

Inclement weather interfered with operations during the initial two weeks of the first period. During the second period, weather conditions were generally favorable.

#### BACKGROUND INFORMATION

Explorations for bottom fish and shellfish in the Prince William Sound area (fig. 1), Alaska, were undertaken by the U. S. Fish and Wildlife Service's exploratory fishing vessel John N. Cobb during 1954. Fishing operations were carried out from February 26 to April 6 and from July 13 to September 8.

The Prince William Sound explorations were part of the Service's long-range plan to explore the untapped fishery resources of waters in and near Alaska. The explorations were scheduled at this time in an attempt to locate commercial quantities of bottom fish, shrimp, and king crab, the utilization of which would help to replace the revenue lost as the result of the depletion of pink salmon in this area.

During the first period of the explorations (February 26 to April 6), 102 otter-trawl drags were made for bottom fish and king crab, and 18 beam-trawl drags were made for shrimp. During the second period of the explorations (July 13 to September 8), 88 otter-trawl drags and 90 beam-trawl drags were made, and, in addition, 93 king-crab pots and 69 shrimp traps were set.



Fig. 3 - Removing king crab from pot. Four collapsed pots are stacked near stern.

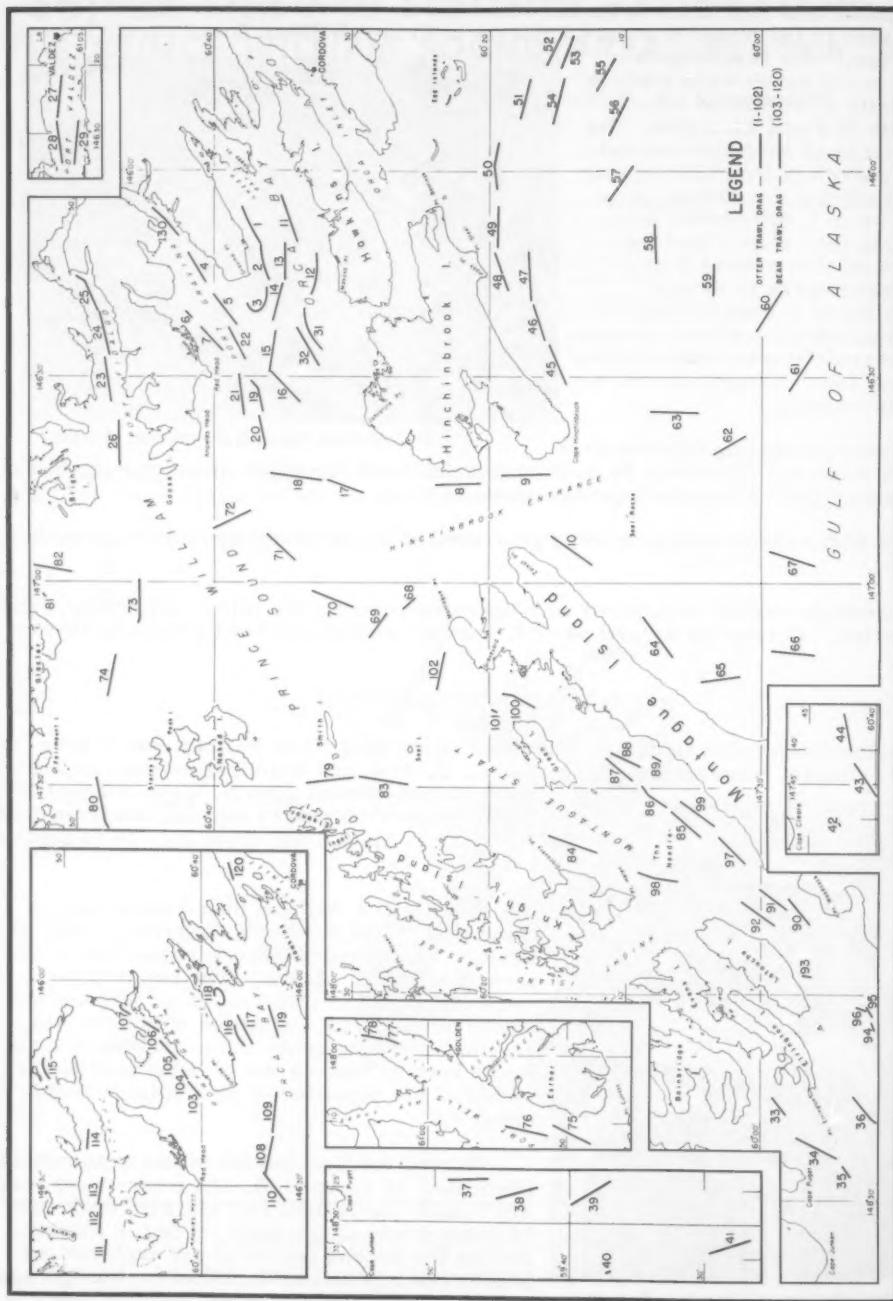


Fig. 4 - Location of otter-trawl drags and beam-trawl drags, first period (February 26 to April 6, 1954).

In 1931, small quantities of shrimp were processed experimentally at Cordova, but no statistics on the amounts are available (Bower 1932). During most of the succeeding years from 1931 to 1940, limited quantities of shrimp were processed in connection with the canning of dungeness crab. Fishing boats outfitted with beam trawls have landed limited amounts of shrimp at Cordova in recent years, but no consistent shrimp fishery has been established there (Wigutoff 1953).

During the spring of 1941, otter trawls were experimentally fished in certain parts of Prince William Sound by the Alaska King Crab Investigation of the Fish and Wildlife Service (Anonymous 1942). At that time, catches of bottom fish, which were taken incidental to the king-crab fishing, were usually small. Except for two drags in Simpson Bay, each of which caught approximately 1,500 pounds, not more than 660 pounds of bottom fish were taken per drag. Because only small numbers of king crab were caught in the experimental fishing, the area was not thoroughly explored.

#### GEAR USED

OTTER TRAWL: All drags for bottom fish and king crab were made with a standard 400-mesh western trawl. (Details of the trawl are described by Alverson 1951.) The wings, body, and intermediate of the trawl were  $4\frac{1}{4}$ -inch mesh.<sup>1/</sup> A 5-inch-mesh cod end was used exclusively during the first period. During the second period, a 5-inch-mesh cod end was used for all drags made in Prince William Sound proper, and a  $3\frac{1}{2}$ -inch-mesh cod end was used for most drags made in offshore areas likely to be inhabited by Pacific ocean perch (Sebastodes alutus). The smaller-mesh cod end was used to prevent excessive gilling and possible loss of marketable-size individuals of this species.

As it was desired to sample the bottom-fish and king-crab populations simultaneously, the use of standard commercial king-crab trawls, which have a 12-inch-mesh cod end, was not feasible.

BEAM TRAWL: All drags for shrimp were made with a 20-foot beam trawl. The net was constructed with 36-thread  $1\frac{1}{2}$ -inch-mesh cotton webbing, 150 meshes deep. (Details of the beam trawl are described by Ellson and Livingstone 1952.)

KING-CRAB POTS: A patented box-shaped collapsible-type king-crab pot was used (figs. 2 and 3). The bottom frame was 36 inches wide and 72 inches long, and the top frame was 36 inches wide and 60 inches long. Each end frame was shaped like an inverted "U" and had 30-inch sides and a 34-inch top. Eyes were bent in the tips of the end frames to secure them to the bottom frame. These eyes hinged the end frames to the bottom frame to provide for setting up or collapsing the pot. Hooks welded to the sides of the end frames, near the corners, supported the top frame when the pot was set up for fishing. All of the frames were made of  $\frac{5}{8}$ -inch-diameter galvanized mild-steel rods.

The sides and ends of the pot were covered with 96-thread  $4\frac{1}{2}$ -inch-mesh tarred cotton webbing lashed to the top and bottom frames, which were covered with 2-inch by 4-inch (open mesh) 15-gauge galvanized wire netting. A rectangular-shaped tunnel-entrance frame at each end was 7 by 14 inches and was made of  $\frac{1}{4}$ -inch-diameter galvanized mild steel. The tunnel indentations were formed by pulling the tun-

<sup>1/</sup>All mesh sizes in this report refer to stretched measure.



Fig. 5 - A "floater" (full cod end) of Pacific ocean perch being brought alongside the exploratory fishing vessel John N. Cobb.

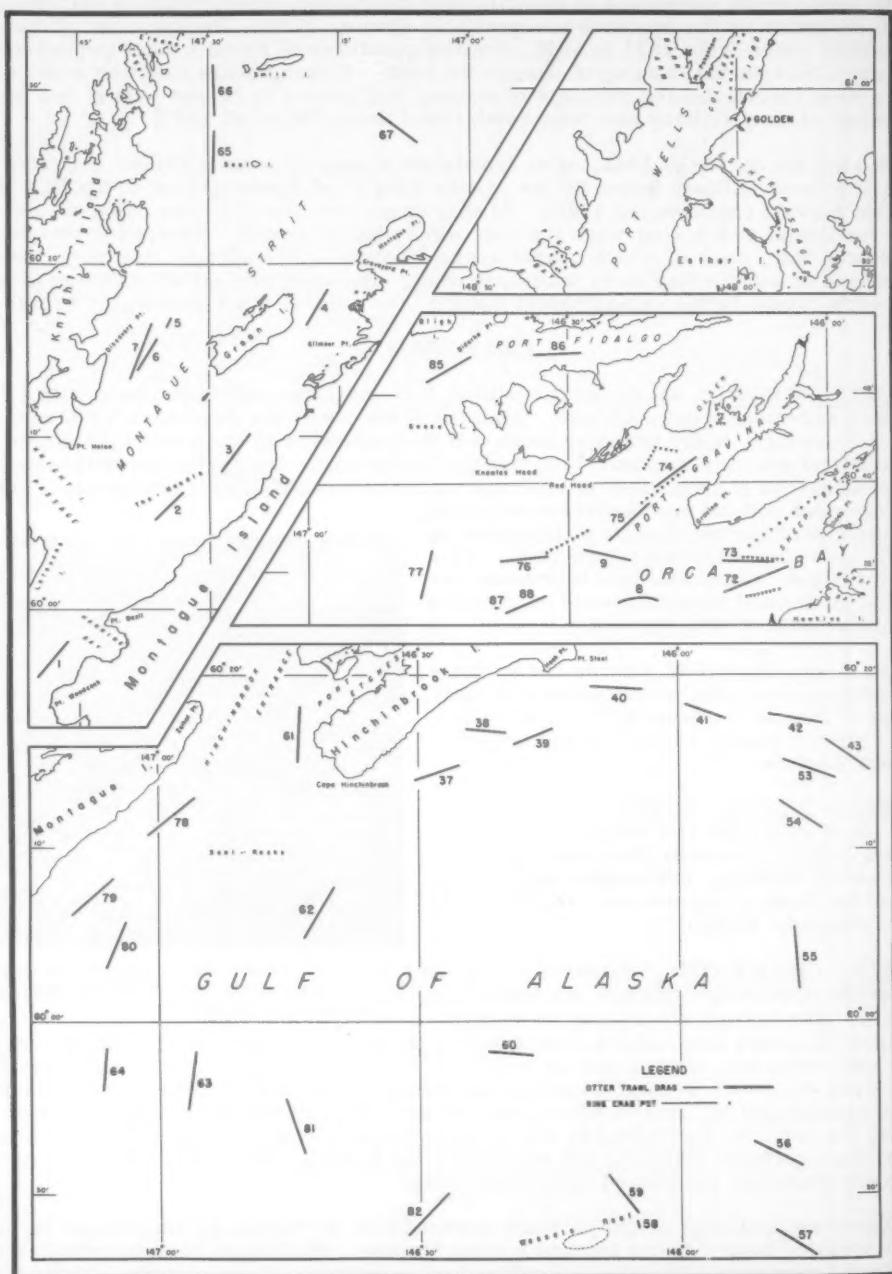


Fig. 6 - Location of otter-trawl drags and king-crab pots in Prince William Sound proper and otter-trawl drags in offshore waters from off Montague Island to off the Egg Islands, second period (July 13 to September 8, 1954).

nel entrance frames toward each other and then tying them in place with tarred lines. Triggers were made of 16-gauge wire.

Access to the inside of the pot for baiting and removing the catch was through a semicircular opening in the top. A lid of galvanized wire netting framed with 8-gauge galvanized wire covered this opening.

Bait was cut into small pieces and placed in a net bait bag that was then suspended between the tunnel entrance frames. Except for the first few sets in which only frozen herring was used, frozen herring and fresh scrap fish were always used simultaneously in the same pot.

**SHRIMP TRAPS:** Both two-tunnel galvanized-iron shrimp traps were fished. These traps were of the same types as those used during the 1952 (Schaefers 1953) and 1953 (Schaefers and Smith 1954) shellfish explorations of the John N. Cobb.

#### FISHING RESULTS

Detailed results of otter-trawl and beam-trawl drags for the first period are tabulated in tables 1 and 3, respectively; and the location of each drag is diagrammatically illustrated in figure 4. Detailed results of otter-trawl and beam-trawl drags for the second period are tabulated in tables 2 and 4, respectively; and the location of each otter-trawl drag is diagrammatically illustrated in figures 6 and 8, and of each beam-trawl drag in figure 10. Results of the king-crab-pot sets and the shrimp-trap sets are tabulated in tables 5 and 6, respectively. The location of each king-crab pot is diagrammatically illustrated in figure 6.

#### FISHING RESULTS OBTAINED IN PRINCE WILLIAM SOUND PROPER

**ORCA BAY AREA:** **First Period:** Fifteen otter-trawl drags at depths of 28 to 84 fathoms yielded small catches. Starry flounder (*Platichthys stellatus*), flathead "sole" (*Hippoglossoides elassodon*), and lemon "sole" (*Pleuronectes quadrituberculatus*) were taken in amounts up to 75 pounds, 50 pounds, and 30 pounds per drag, respectively. English "sole" (*Parophrys vetulus*), rock "sole" (*Lepidotsetta bilineata*), and true cod (*Gadus macrocephalus*) were taken in trace<sup>2/</sup> amounts. Halibut (*Hippoglossus stenolepis*)<sup>3/</sup> were taken in amounts ranging from 0 to 58 individuals per drag. Six king crab (*Paralithodes camtschatica*),<sup>4/</sup> the majority of which were in the soft-shell state, were also taken.

Shrimp operations were of a preliminary nature, and only a limited number of drags were made with the beam trawl. The best drag caught 109 pounds<sup>5/</sup> of pink shrimp (*Pandalus borealis*) and 27 pounds of side-stripe shrimp (*Pandalopsis dispar*) per hour.<sup>6/</sup>

<sup>2/</sup> A trace is less than 20 pounds of fish.

<sup>3/</sup> Halibut were measured and released at the request of the International Pacific Halibut Commission.

<sup>4/</sup> Unless otherwise noted, only legal-size king crab (hard-shell males not less than 6½ inches in greatest width of shell) are referred to in the text. Complete tabulations of all male and female king crab caught during these explorations are given in tables 1 to 5.

<sup>5/</sup> Complete details of number of whole (heads on) shrimp per pound for all beam-trawl drags are given in tables 3 and 4.

<sup>6/</sup> Shrimp-catch results have been converted to a rate-per-hour basis to permit catch comparison of shrimp drags made for different lengths of time.



Fig. 7 - Emptying the beam trawl on the deck of the John N. Cobb. Mostly trash and few shrimp were caught in this drag.

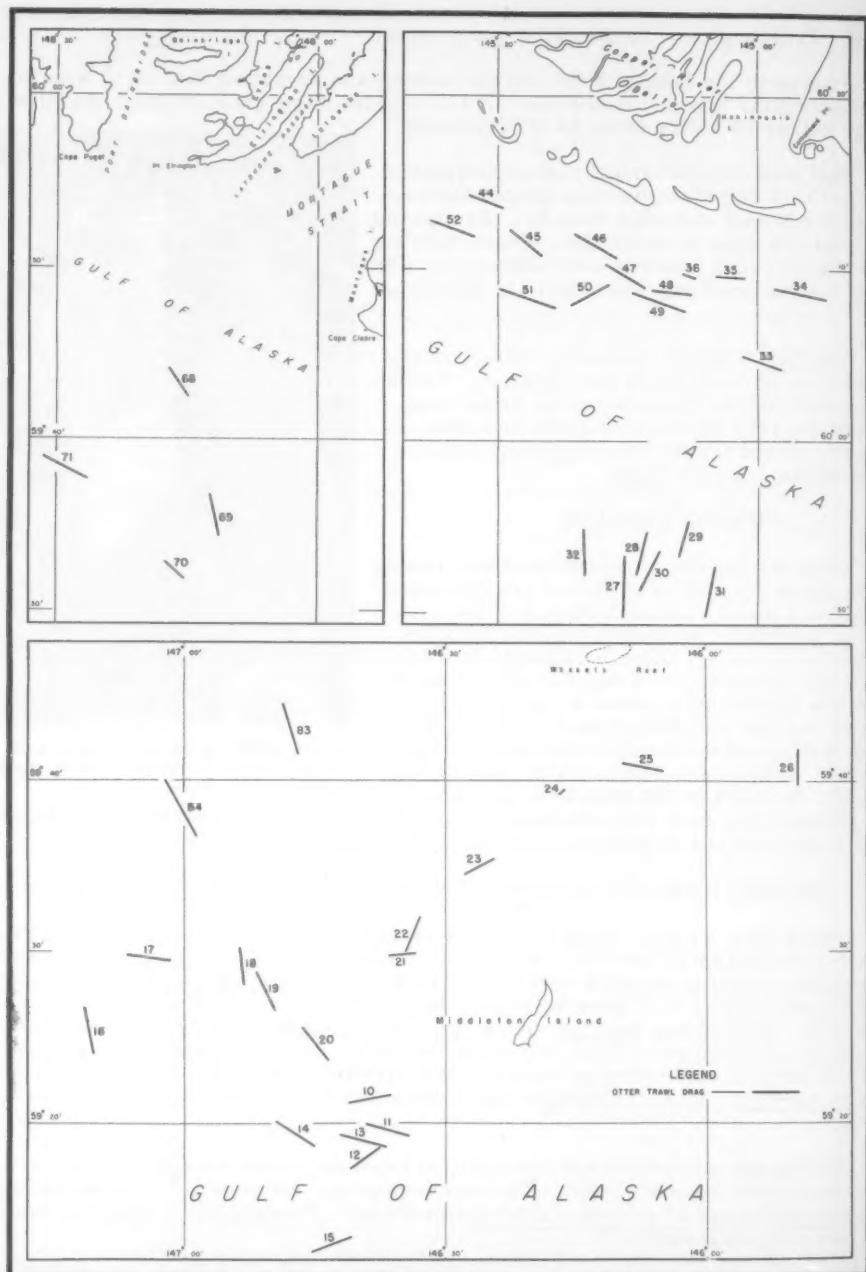


Fig. 8 - Location of otter-trawl drags off Point Elrington, off the Copper River Delta, and in the vicinity of Middleton Island, second period (July 13 to September 8, 1954).

Second Period: Seven otter-trawl drags<sup>7/</sup> were made at depths of 52 to 88 fathoms. Catches per drag ranged from 35 to 500 pounds for true cod, from 50 to 250 pounds for flathead "sole," and from 0 to 8 individuals for halibut, and from 1 to 12 individuals for king crab.

The best catches of pink shrimp were obtained from off Canoe Passage to off Makaka Point, where 10 drags at depths of 58 to 86 fathoms caught from 96 to 262 pounds and averaged 154 pounds per hour. Catches of side-stripe shrimp in these drags were insignificant. The largest catch of side-stripe shrimp was taken off Windy Bay, where a single drag at 116 to 122 fathoms caught 84 pounds of small side-stripe shrimp and 120 pounds of pink shrimp per hour. In outer Orca Bay, pink shrimp were taken at the rate of 194 pounds per hour in a drag at 69 to 75 fathoms. Small numbers of king crab (up to 5 per drag) were taken in the beam trawl. Dragging bottom that was free of obstructions and suitable for drags of several hours' duration was prevalent. Side-slope drags yielded poor results, and the best shrimp catches occurred on relatively flat bottom or in slight depressions.

King-crab pot sets in Orca Bay and Sheep Bay averaged from less than 1 to 2.6 king crab per pot. The best catch was taken in a set of 9 pots off Canoe Passage at depths of 82 to 85 fathoms.

PORT GRAVINA AREA: First Period: Five otter-trawl drags in Port Gravina resulted in poor catches.

Shrimp catches in 5 beam-trawl drags were less than 70 pounds of shrimp per hour.

Second Period: Only one otter-trawl drag was made. It resulted in a poor catch.

The best shrimp catches were made from near the entrance to off Olsen Bay, where 4 drags at depths of 70 to 83 fathoms averaged 199 pounds of predominately pink shrimp per hour, with the best catch yielding 310 pounds of pink shrimp and 20 pounds of side-stripe shrimp. The dragging bottom was good in this vicinity, and catches were quite clean. A single drag near the head of Port Gravina at 54 to 71 fathoms caught 114 pounds of pink shrimp, 16 pounds of side-stripe shrimp, and 16 pounds of coon-stripe shrimp (Pandalus hypsinotus) per hour. Considerable amounts of small fish, kelp, and bottom debris were present in this drag.

A set of 9 king-crab pots in 68 to 78 fathoms near the entrance of Port Gravina yielded catches ranging from 0 to 6 individual king crab per pot, with an average catch of 2.6. King-crab pots set east of Red Head and in Olsen Bay at shallower depths were much less productive. Shrimp traps set in Olsen Bay at 11 to 34 fathoms caught only a few pink shrimp.

PORT FIDALGO: First Period: With the exception of small areas near the entrance and near the head, favorable dragging bottom was limited to depths of slightly over 100 fathoms. Four otter-trawl drags at 84 to 116 fathoms resulted in negligible catches of bottom fish and king crab.

Beam-trawl drags produced shrimp, but even the best drag yielded only 65 pounds of pink shrimp per hour.

Second Period: In two drags made during this time, the best catch of bottom fish and king crab was taken in a drag at 83 to 98 fathoms near the entrance. This drag caught 225 pounds of true cod, 50 pounds of flathead "sole," 1,200 pounds of pollock (Theragra chalcogramma), and 14 king crab. Drags for shrimp yielded less than 90 pounds per hour. Although no snags were encountered, beam-trawl catches

<sup>7/</sup> Drag No. 87, which was made near the entrance of Orca Bay, hung up and therefore is not included.

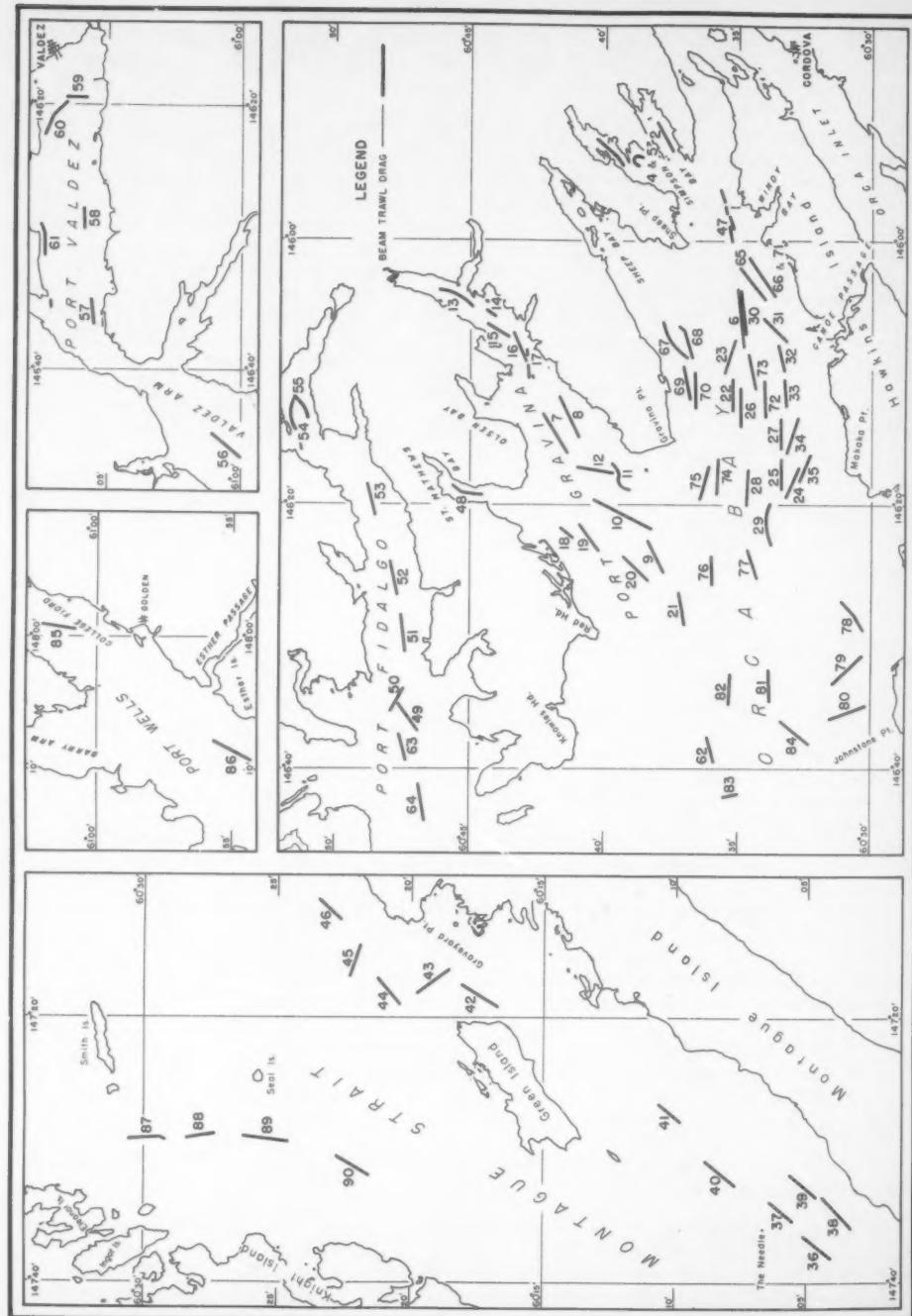


Fig. 10 - Location of beam-trawl drags, second period (July 13 to September 8, 1954)

(except those near the head) contained considerable amounts of trash--mainly shells, pieces of wood, kelp, and basket stars. With the exception of pieces of wood and kelp, otter-trawl catches were cleaner because of the larger mesh size.

PORT VALDEZ AND VALDEZ ARM: First Period: Three otter-trawl drags in Port Valdez at depths of 120 to 138 fathoms resulted in negligible catches. The bottom was strewn with debris and trash. Two drags were made near the entrance of Valdez Arm at depths of 200 to 206 fathoms with negligible results. In Valdez Arm, the bottom was more uneven and the depths were greater than in Port Valdez.

Second Period: Five beam-trawl drags in Port Valdez and one beam-trawl drag in Valdez Arm produced negligible shrimp catches. These drags were made at depths of 97 to 209 fathoms.

#### ESTHER PASSAGE:

First Period: The bottom in Esther Passage was too irregular for trawling.

Second Period: Nine king-crab pots set at depths of 52 to 90 fathoms for 20 hours caught a total of 30 king crab. The number of king crab in each pot ranged from 0 to 8.

COLLEGE FIORD: First Period: Two otter-trawl drags made in this area encountered snags, and catches were negligible.

Second Period: A single beam-trawl drag resulted in a broken beam. Despite this difficulty, 212 pounds of shrimp per hour were taken. The catch consisted of 62 percent pink, 36 percent coon-stripe, and 2 percent spot shrimp (Pandalus platyceros). The spot shrimp were large, averaging 7 whole (heads-on) shrimp per pound.

The best results from king-crab-pot sets were obtained here. A set of 9 pots at 43 to 68 fathoms for 23½ hours caught 41 king crab.<sup>8/</sup> The number of individuals per pot ranged from 0 to 14.

PORT WELLS AREA: First Period: Two otter-trawl drags at depths of 220 to 228 fathoms yielded poor results.

Second Period: A single beam-trawl drag at depths of 209 to 215 fathoms resulted in a torn net. In Pigot Bay, a set of 9 king-crab pots caught 22 king crab of which 20 were Paralithodes camtschatica and 2 were Paralithodes platypus.

MONTAGUE STRAIT AREA: First Period: Twenty-one otter-trawl drags were made from near the entrance of Montague Strait to off Montague Point and Eleanor Island at depths of 18 to 150 fathoms. The largest catch of king crab taken in any one drag during either period was made in drag number 85 at 68 to 74 fathoms near The Needle. Thirty-two legal-size male king crab, all in the soft-shell state, were caught.

<sup>8/</sup> This catch consisted of 23 Paralithodes camtschatica, averaging 9.4 pounds each, and 18 Paralithodes platypus, averaging 6.4 pounds each.



Fig. 9 - A good catch of Pacific ocean perch (right) and sablefish (left) in deck bins aboard the John N. Cobb.

The other drags at this time caught a total of only 8 legal-size male king crab, all in the soft-shell state. The average catch of halibut was 11.0 individuals per drag. Usually only trace catches of other desirable species of bottom fish were made. Dragging bottom was generally favorable, except near the entrance, where 4 drags hung up.

Second Period: Nine otter-trawl drags were made at depths of 40 to 155 fathoms. Catches of true cod and flathead "sole" ranged up to 300 pounds per drag, and halibut averaged 4.4 individuals per drag. Catches of arrow-toothed flounder (*Atheresthes stomias*) ranged up to 1,600 pounds per drag. King-crab catches were insignificant.

The best shrimp catches were obtained in 3 drags from off the northeast end of Green Island to off Graveyard Point at 67 to 85 fathoms. These drags caught up to 310 pounds of shrimp per hour and averaged 207 pounds of predominately pink shrimp per hour.

MIDDLE PRINCE WILLIAM SOUND: First Period: Otter-trawl drags from off Montague Point to off Storey Island at depths of 90 to 274 fathoms produced negligible results.

Second Period: Results of two widely-separated drags also yielded negligible results.

#### FISHING RESULTS OBTAINED IN OFFSHORE WATERS ADJACENT TO PRINCE WILLIAM SOUND

FIRST PERIOD: In the area off Cape Puget, otter-trawl drags were made at depths of 43 to 110 fathoms. The best drag caught only 125 pounds of true cod. Between Cape Cleare and the Egg Islands, 27 drags were made at depths of 10 to 152 fathoms, with poor results. Starry flounder (up to 50 pounds per drag) were present in all drags at 10 to 32 fathoms, and halibut (up to 21 individuals per drag) were present in nearly all drags at these depths. The rest of the drags were made at 34 to 152 fathoms and usually caught only trace amounts of true cod and arrow-toothed flounder, along with small numbers of halibut.

SECOND PERIOD: Good quantities of Pacific ocean perch (*Sebastodes alutus*) and sablefish (*Anoplopoma fimbria*) were taken in the offshore waters adjacent to Prince William Sound.

In the area 12 to 24 miles south of Point Elrington, 4 drags produced catches of 2,300 to 3,800 pounds of Pacific ocean perch and up to 1,000 pounds of sablefish. These drags were made at depths of 90 to 122 fathoms. The bottom dragged was predominately gray mud and sand and was generally good, although the drag that caught the most Pacific ocean perch snagged after 30 minutes. From 700 to 1,700 pounds of arrow-toothed flounder were also taken in these drags. Pacific ocean perch from this area averaged 15.6 inches in length. Sablefish averaged 25.7 inches in length and 6.7 pounds in weight.

Pacific ocean perch grounds were also located in the area southwest to west of Middleton Island. The best drag (number 15) at 108 to 112 fathoms yielded 6,000 pounds of Pacific ocean perch. A slight tear was noted in the net after this drag. Several other drags in this area encountered snags and resulted in badly torn nets. However, the bottom dragged was generally favorable, and in no instance did the gear hang up. Pacific ocean perch averaged 15.5 inches in length. Most of the sablefish taken in this area were small and only 15 percent of the best catch (625 pounds) were of marketable size.

Approximately 10 miles east of Wessels Reef, 2 drags at 52 to 59 fathoms yielded 200 pounds and 1,000 pounds of Pacific ocean perch.

Two of a series of drags at 53 to 95 fathoms that were made approximately 30 miles off the Copper River Delta yielded catches of 600 pounds and 1,500 pounds of Pacific ocean perch. The dragging bottom in this area was generally clear.

Drags off the east side of Montague Island at depths of 81 to 154 fathoms usually yielded poor results, although drag number 63, which was made at 81 to 84 fathoms, caught 1,000 pounds of Pacific ocean perch.

Other drags in the offshore waters were generally made at depths of less than 50 fathoms. In the region between Cape Hinchinbrook and the Egg Islands, starry flounder was the dominant commercially-desirable species taken. The two best catches (1,300 and 1,800 pounds per drag) of this species were made between Cape Hinchinbrook and Hook Point at 20 to 28 fathoms. These starry flounder averaged 19.8 inches in length. Other catches were dominated by trash fish, mostly skates (Rajidae).

Catches from drags at 10 to 55 fathoms between the Egg Islands and Cottonwood Point consisted mostly of skates and of dogfish (Squalus suckleyi), although the catch of drag number 47 at 24 to 26 fathoms caught 900 pounds of starry flounder and only a few trash fish.

#### WEATHER CONDITIONS

During the initial two weeks of the first period gale-force winds occurred frequently, hampering operations in Prince William Sound proper and preventing operations in adjacent offshore waters. After this time, weather conditions were generally favorable in all areas.

During the second period, weather conditions were generally favorable.

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Note: The fishing logs of otter-trawl drags, beam-trawl drags, king-crab-pot catches, and shrimp-trap catches are shown in tables 1, 2, 3, 4, 5, and 6 (pp. 18-28).

Table 1 - Fishing Log of Otter-Trawl Drags Made During the First Period (February 26 to April 6, 1954)

Note: For explanation of footnotes, see p. 21. .

Table I - Fishing Log of Otter-Trawl Drags Made During the First Period (February 26 to April 6, 1954) (Continued)

Note: For explanation of footnotes, see p. 21.

Table 1 - Fishing Log of Other-Trawl Drags Made During the First Period (February 26 to April 6, 1954) (Continued)

Drift No.	53	54	55	56	57	58	59	60	61	62	63	64	65
Date	3/18/54	3/19/54	3/19/54	3/19/54	3/19/54	3/19/54	3/19/54	3/19/54	3/19/54	3/19/54	3/19/54	3/19/54	3/19/54
Latitude N $\circ$	60 $^{\circ}$ 13' 7"	60 $^{\circ}$ 10' 8"	60 $^{\circ}$ 09' 5"	60 $^{\circ}$ 09' 5"	60 $^{\circ}$ 07' 8"	60 $^{\circ}$ 05' 5"	60 $^{\circ}$ 03' 5"	60 $^{\circ}$ 02' 5"	60 $^{\circ}$ 01' 2"	60 $^{\circ}$ 00' 2"	59 $^{\circ}$ 58' 5"	59 $^{\circ}$ 57' 7"	59 $^{\circ}$ 56' 5"
Longitude W $\circ$	115 $^{\circ}$ 10' 41"	115 $^{\circ}$ 03' 71"	115 $^{\circ}$ 03' 71"	115 $^{\circ}$ 03' 71"	115 $^{\circ}$ 03' 61"	115 $^{\circ}$ 03' 51"							
Course, magnetic 3/	260°	259°	272°	269°	277°	269°	269°	269°	275°	275°	275°	275°	275°
Depth range in fathoms	10-40	10-40	10-40	10-40	10-40	10-40	10-40	10-40	10-40	10-40	10-40	10-40	10-40
Type of bottom	Trawling	Trawling	Trawling	Trawling	Flood								
Tide on bottom in minutes	60	60	60	60	60	60	60	60	60	60	60	60	60
Estimated total catch in pounds	120	20	130	275	225	90	15	50	70	35	120	50	300
Catch in pounds (% artefacts)													
Flat fish													
English													
Flounder													
Hallibut													
Lemon													
Rock													
Sard													
Starry flounder													
Atron-spotted flounder (turbot)													
Bottom fish													
Pelagic													
Shelduck													
Tuna													
Rock sole													
Pacific ocean perch													
Red snapper													
Mackerel													
Bluefish													
Weakfish													
Shore fishes													
Small pelagic fishes													
Pompano													
Drift No.	66	67	68	69	70	71	72	73	74	75	76	77	78
Date	3/21/54	3/21/54	3/21/54	3/21/54	3/21/54	3/21/54	3/21/54	3/21/54	3/21/54	3/21/54	3/21/54	3/21/54	3/21/54
Latitude N $\circ$	59 $^{\circ}$ 22' 31"												
Longitude W $\circ$	117 $^{\circ}$ 12' 41"												
Course, magnetic 3/	158°	155°	231°	279°	254°	015°	308°	281°	259°	178°	169°	169°	169°
Depth range in fathoms	11-12	11-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12
Type of bottom	Trawling	Trawling	Trawling	Trawling	Flood								
Tide on bottom in minutes	60	60	60	60	60	60	60	60	60	60	60	60	60
Estimated total catch in pounds	1400	65	20	—	75	0	800	350	—	375	300	200	50
Catch in pounds (% artefacts)													
Flat fish													
English													
Flounder													
Hallibut													
Lemon													
Rock													
Shore fishes													
Starry flounder													
Atron-spotted flounder (turbot)													
Bottom fish													
Pelagic													
Shelduck													
Tuna													
Rock sole													
Pacific ocean perch													
Red snapper													
Mackerel													
Bluefish													
Weakfish													
Shore fishes													
Small pelagic fishes													
Pompano													
Drift No.	79	80	81	82	83	84	85	86	87	88	89	90	91
Date	3/22/54	3/22/54	3/22/54	3/22/54	3/22/54	3/22/54	3/22/54	3/22/54	3/22/54	3/22/54	3/22/54	3/22/54	3/22/54
Latitude N $\circ$	59 $^{\circ}$ 22' 31"												
Longitude W $\circ$	117 $^{\circ}$ 12' 41"												
Course, magnetic 3/	158°	155°	231°	279°	254°	015°	308°	281°	259°	178°	169°	169°	169°
Depth range in fathoms	11-12	11-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12
Type of bottom	Trawling	Trawling	Trawling	Trawling	Flood								
Tide on bottom in minutes	60	60	60	60	60	60	60	60	60	60	60	60	60
Estimated total catch in pounds	1400	65	20	—	75	0	800	350	—	375	300	200	50
Catch in pounds (% artefacts)													
Flat fish													
English													
Flounder													
Hallibut													
Lemon													
Rock													
Shore fishes													
Starry flounder													
Atron-spotted flounder (turbot)													
Bottom fish													
Pelagic													
Shelduck													
Tuna													
Rock sole													
Pacific ocean perch													
Red snapper													
Mackerel													
Bluefish													
Weakfish													
Shore fishes													
Small pelagic fishes													
Pompano													
Drift No.	92	93	94	95	96	97	98	99	100	101	102	103	104
Date	3/23/54	3/23/54	3/23/54	3/23/54	3/23/54	3/23/54	3/23/54	3/23/54	3/23/54	3/23/54	3/23/54	3/23/54	3/23/54
Latitude N $\circ$	59 $^{\circ}$ 22' 31"												
Longitude W $\circ$	117 $^{\circ}$ 12' 41"												
Course, magnetic 3/	158°	155°	231°	279°	254°	015°	308°	281°	259°	178°	169°	169°	169°
Depth range in fathoms	11-12	11-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12
Type of bottom	Trawling	Trawling	Trawling	Trawling	Flood								
Tide on bottom in minutes	60	60	60	60	60	60	60	60	60	60	60	60	60
Estimated total catch in pounds	1400	65	20	—	75	0	800	350	—	375	300	200	50
Catch in pounds (% artefacts)													
Flat fish													
English													
Flounder													
Hallibut													
Lemon													
Rock													
Shore fishes													
Starry flounder													
Atron-spotted flounder (turbot)													
Bottom fish													
Pelagic													
Shelduck													
Tuna													
Rock sole													
Pacific ocean perch													
Red snapper													
Mackerel													
Bluefish													
Weakfish													
Shore fishes													
Small pelagic fishes													
Pompano													
Drift No.	105	106	107	108	109	110	111	112	113	114	115	116	117
Date	3/24/54</												

Table I - Fishing Log of Otter-Trawl Drags Made During the First Period (February 25 to April 6, 1954) (Continued)

Table 2 - Fishing of Otter-Trawl Drags Made During the Second Period (July 13 to September 8, 1954)

Note: For explanation of footnotes, see p. 24.

Table 2 - Fishing of Otter-Trawl Drags Made During the Second Period (July 13 to September 8, 1954) (Continued)

Note: For explanation of tables, see p. 24.

Table 2 - Fishing of Otter-Trawl Drags Made During the Second Period (July 13 to September 8, 1954) (C continued)

the following year. The first two years of the study were spent in the field, collecting data on the growth and development of the plants, and the last two years were spent in the laboratory, analyzing the data and writing the report. The results of the study will be published in a series of papers, the first of which is now in preparation.

Table 3 - Fishing Log of Beam-Trawl Drags Made During the First Period (February 26 to April 6, 1954)

Drag No.	103	104	105	106	107	108	109	110	111
Date	4/5/54	4/5/54	4/5/54	4/5/54	4/5/54	4/5/54	4/5/54	4/5/54	4/5/54
Latitude $N_{\circ}$	60°40.1'	60°41.0'	60°41.8'	60°45.2'	60°45.3'	60°45.3'	60°45.3'	60°45.3'	60°45.3'
Longitude $W_{\circ}$	116°17.4'	116°11.7'	116°11.7'	116°08.6'	116°05.5'	116°05.5'	116°05.5'	116°05.5'	116°05.5'
Course, magnetic 1/	021°	021°	018°	018°	017°	017°	016°	016°	016°
Tide	Flood	Flood	Ebb	Ebb	Flood	Flood	Ebb	Ebb	Flood
Depth range in fathoms	78-80	80-82	82-101	82-101	68-72	68-72	70-74	70-74	85-101
Type of bottom	Bar. M.	Bar. M.	M.	M.	Bar.	Bar.	Bar.	Bar.	Bar.
Trawling bottom	Clear								
Time on bottom in minutes	30	60	30	30	60	60	60	60	60
Shrimp catch in pounds:									
Pink	4(102) 2/	18(123)	36(120)	20(123)	8(118)	36(87)	12(94)	12(95)	25(105)
Side-striped	3(18)	16(11)	28(31)	13(35)	3(39)	31(11)	13(31)	13(31)	—
Coonstripe	—	—	Trace 2/	1(44)	1(17)	—	—	—	—
Total shrimp catch in pounds	7	34	61	37	12	36	55	55	30
Total shrimp catch hourly basis	14	64	37	24	13	36	55	55	30
King crab 1/									
Legal-size males	—	—	—	—	—	—	—	—	—
Small males	—	—	—	—	—	—	—	—	—
Females	—	—	—	—	—	—	—	—	—
Remarks									
Drag No.	112	113	114	115	116	117	118	119	120
Date	4/5/54	4/5/54	4/5/54	4/5/54	4/5/54	4/5/54	4/5/54	4/5/54	4/5/54
Latitude $N_{\circ}$	60°41.4'	60°41.5'	60°41.6'	60°41.6'	60°41.6'	60°41.6'	60°41.6'	60°41.6'	60°41.6'
Longitude $W_{\circ}$	116°27.3'	116°27.3'	116°27.3'	116°27.3'	116°27.3'	116°27.3'	116°27.3'	116°27.3'	116°27.3'
Course, magnetic 1/	022°	022°	022°	022°	022°	022°	022°	022°	022°
Tide	Flood	Flood	Flood	Flood	Flood	Flood	Ebb	Ebb	Ebb
Depth range in fathoms	91-106	91-106	91-106	91-106	91-106	91-106	80-88	80-88	80-88
Type of bottom	st.	st.	st.	st.	st.	st.	M.	M.	M.
Trawling bottom	Clear								
Time on bottom in minutes	60	60	60	60	60	60	30	30	30
Shrimp catch in pounds:									
Pink	4(65) 2/	7(82)	65(74) 3/	76(65)	—	—	18(88)	—	—
Side-striped	6(57)	5(36)	Trace 2/	76	76	76	7(34)	—	—
Coonstripe	—	—	—	—	—	—	—	—	—
Total shrimp catch in pounds	10	12	65	65	—	—	25	25	—
Total shrimp catch hourly basis	10	12	—	—	—	—	—	—	—
King crab 1/									
Legal-size males	—	—	—	—	—	—	—	—	—
Small males	—	—	—	—	—	—	—	—	—
Females	—	—	—	—	—	—	—	—	—
Remarks									

1/ Course given is between starting point and end point.  
 2/ Figures in parentheses indicate number of whole shrimp per pound.  
 3/ "Trace" = less than one pound of shrimp.

1/ Most king crab taken during the first period were soft-shelled.  
 2/ Brackets figures indicate number of individuals instead of pounds.

Symbol for types of bottom  
 No. M. = mud | silt & sand and gravel | hrd. = hard  
 M. = soft

Table 4 - Fishing Log of Beam-Trawl Drags Made During the Second Period (July 13 to September 8, 1954)

Drag No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Date	6/1/54	6/1/54	6/1/54	6/1/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54
Latitude, $\text{N}_\circ$	60°35'2"	60°38'11"	60°38'21"	60°38'31"	60°38'37"	60°35'0"	60°35'11"	60°35'17"	60°35'21"	60°35'27"	60°35'33"	60°35'39"	60°35'45"	60°35'51"	60°35'57"
Longitude, $E_\circ$	146°59'1"	146°59'1"	146°59'2"	146°59'3"	146°59'3"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"
Course, magnetic $\angle^{\circ}$	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0
Tide range in fathoms	High	Low	Low												
Type of bottom	Clay	Clay													
Time on bottom in minutes	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Shrimp catch in pounds:															
Fish	54(67) $\frac{2}{3}$	55(91) $\frac{2}{3}$													
Blades	Conch	Conch													
Total catch in pounds	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total shrimp catch in pounds	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total catch which hourly held	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Fish, crab															
Total catch miles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom
Remarks															
Drag No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Latitude, $N_\circ$	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"
Longitude, $E_\circ$	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"	146°57'0"
Course, magnetic $\angle^{\circ}$	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0
Tide range in fathoms	High	Low	Low												
Type of bottom	Clay	Clay													
Time on bottom in minutes	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Shrimp catch in pounds:															
Fish	16(75) $\frac{2}{3}$														
Blades	Conch	Conch													
Total catch in pounds	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total shrimp catch in pounds	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total catch which hourly held	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Fish, crab															
Total miles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom
Remarks															
Drag No.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Date	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54	6/2/54
Latitude, $N_\circ$	60°34'11"	60°34'25"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"	60°34'31"
Longitude, $E_\circ$	146°59'1"	146°59'1"	146°59'2"	146°59'3"	146°59'3"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"	146°59'4"
Course, magnetic $\angle^{\circ}$	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0
Tide range in fathoms	High	Low	Low												
Type of bottom	Clay	Clay													
Time on bottom in minutes	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Shrimp catch in pounds:															
Fish	15(86) $\frac{2}{3}$														
Blades	Conch	Conch													
Total catch in pounds	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total shrimp catch in pounds	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total catch which hourly held	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Fish, crab															
Total miles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom	bottom
Remarks															

Notes: For explanation of footnotes, see p. 27.

Table 4—Fishing Log of Beam-Trawl Dragger Made During Second Period Only from September 6, 1954 (Continued)

Drift No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Date	8/20/54	8/21/54	8/22/54	8/23/54	8/24/54	8/25/54	8/26/54	8/27/54	8/28/54	8/29/54	8/30/54	8/31/54	8/32/54	8/33/54	8/34/54	8/35/54	8/36/54	8/37/54	8/38/54	8/39/54	
Latitude, N. Longitude, W.	60°0'22.71" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	60°0'55.30" 116°52.61"	
Course, magnetic Tide range in Fathoms Type of bottom Time on bottom in minutes	016° 116° 116° 30	016° 116° 116° 30	020° 116° 116° 30																		
Shrimp catch in pounds: Plan Gobies Cobia Total shrimp catch hourly basis	60(90) 2/ 100 100 30	60(90) 2/ 100 100 30	30(50) 80 80																		
King crab Legislative station Small miles Penalties	(1) (2) —	(1) (2) —	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Buoys	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved
Drift No.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81
Date	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	8/21/54	
Latitude, N. Longitude, W.	61°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"	60°0'45.61" 116°52.50"
Course, magnetic Tide range in Fathoms Type of bottom Time on bottom in minutes	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30
Shrimp catch in pounds: Plan Gobies Cobia Total shrimp catch hourly basis	6(76) 2/ 11 11 30	6(76) 2/ 11 11 30	2(47) 10 80																		
King crab Legislative station Small miles Penalties	(1) (2) —	(1) (2) —	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Buoys	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved
Drift No.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
Date	8/20/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	8/19/54	
Latitude, N. Longitude, W.	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"	60°0'26.51" 116°52.51"
Course, magnetic Tide range in Fathoms Type of bottom Time on bottom in minutes	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30	020° 116° 116° 30
Shrimp catch in pounds: Plan Gobies Cobia Total shrimp catch hourly basis	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30	1(16) 16 16 30
King crab Legislative station Small miles Penalties	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Buoys	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved	Curved

 Symbols for Zones of Bottom  
 0 to 10 fms = blue sand  
 10 to 20 fms = grey sand  
 20 to 30 fms = white sand

 1/ Curves give 1/2 between starting point and point of  
 2/ "Trawl" = less than one pound of shrimp.  
 3/ Shaded areas indicate number of individuals  
 instead of pounds.

Table 5 - King-Crab-Pot Catches - Second Period (July 13 to September 8, 1954)

Vicinity	Set Number	Date Out	Date In	Tide	Depth in Fathoms	Number of Sets	Total Hours Out	Bait	King Crab Catch			Total Crab Catch
									No.	Level Miles At 45°, 40°, 35°	Small Whales	
Oleos Bay	1	8/2/54	8/10/54	Hib	11-20	10	15½	Herring	1	7.00	---	23
Port Gravina, east of Red Head	2	8/4/54	8/5/54	Flood	35-45	10	27	Herring	6	9.75	8	12
Sheep Bay	3	8/5/54	8/6/54	Flood	20-41	10	20½	Herring	3	8.75	23	88
Olea Bay, off Cape Passage	4	8/8/54	8/11/54	Flood	85-95	9	65	Herring and scrap fish	23	10.47	3	30
Port Gravina, near entrance	5	8/11/54	8/14/54	Hib	65-75	9	75	Herring and scrap fish	23	11.72	2	40
Olea Bay's off Red Head	6	8/14/54	8/15/54	High	54-70	9	21	Herring and scrap fish	13	9.91	2	10
Olea Bay's off entrance of Sheep Bay	7	8/15/54	8/17/54	Flood	56-70	9	16½	Herring and scrap fish	5	11.66	4	10
Nether Passage	8	9/1/54	9/5/54	Hib	52-90	9	20	Herring and scrap fish	30	7.88	8	28
College Fiord, near Golden	9	9/5/54	9/6/54	High	13-63	9	2½	Herring and scrap fish	11	8.10	15	34
Flaget Bay	10	9/6/54	9/7/54	Flood	16-72	9	20	Herring and scrap fish	22	7.10	16	56

Table 6 - Shrimp-Trap Catches - Second Period (July 13 to September 8, 1954)

Vicinity	Set Number	Date Out	Date In	Tide	Depth in Fathoms	Number of Traps	Total Hours Out	Bait	Shrimp Catch			Remarks
									Spot	No. of Whole Shrimp Per Pound	Ocean-Stripe	
Olea Bay	1	8/2/54	8/4/54	Hib	11-31	17	10	Herring	---	---	---	---
Launderhook Bay	2	8/12/54	8/13/54	Flood	9-60	10	77	Herring	---	---	---	few pink shrimp
College Fiord, near Golden	3	9/5/54	9/6/54	Hib	30-56	12	96	Herring and scrap fish	1	10	29	16-34



## OYSTER-PROCESSING RESEARCH FOR ATLANTIC AND GULF COASTS

The technological research program for the study of the oyster industry of the South Atlantic and Gulf Coasts under the terms of the Saltonstall-Kennedy Act became fully active during February 1955 when contracts were signed with three Universities in the Gulf Coast States. The research programs of the three groups of

investigators will supplement each other with practically no overlapping.



Oysters being gathered by tongs.

storage of oyster products. This group is headed by Dr. Betty M. Watts of the Section of Food and Nutrition, assisted by Dr. Harvye Lewis and four graduate students. Dr. R. W. Menzel of the Zoology Department also will cooperate in obtaining samples of known history, most of which will be from Apalachicola or from nearby Panacea.

The second contract group at Louisiana State University, Baton Rouge, La., will study the effect of variables during the actual freezing processes on quality and amount of drip. They will also make a bacteriological study of oysters from the shell through the shucking, washing, freezing, storage, and thawing operations. A battery of quality tests now being used on shrimp will be used by the Baton Rouge group on all lots of oysters to be frozen, to determine which variables are correlated with organoleptic quality. The group at Baton Rouge will also make periodic collections of oysters in the Gulf States west of Florida so information can be obtained on seasonal and environmental effects on chemical and physical composition. The Baton Rouge work will be under the direction of Dr. E. A. Fieger, Department of Agricultural Chemistry and Biochemistry; Dr. Arthur F. Novak and several graduate students will assist in the work.

The third contract group at Tulane University, New Orleans, La., is working under the direction of Dr. Fred R. Cagle, Department of Zoology. Dr. Milton Fingerman has begun a study of the physiology of the bleeding reaction of oysters.

This bleeding reaction which is chiefly characterized by excessive drip formation on thawing the frozen oysters is much greater for Gulf Coast oysters than for those of the Chesapeake Bay and farther north. It is of primary concern in solving many of the problems encountered in handling and freezing Southern oysters. Dr. Fingerman also plans to investigate the causes of and the physiological basis of the quite variable dark pigmentation found in many of these oysters. This also detracts from their more general acceptance in inland areas.

The staff of the Fishery Technological Laboratory at College Park, Md., will be responsible for the general direction of the contract groups and liaison between the groups. Samples from the entire area have already been collected during the months of November, December, and January. The staff at College Park will continue collections of samples of Atlantic oysters north of Florida during the remainder of the season and will analyze most of all samples collected for chemical and physical composition. These data will be compared with similar data on oysters from all the other main production areas, thus getting essential information on effect of seasonal and geographical variability on composition, as well as variables introduced by different handling practices in commercial processing plants.

--C. F. Lee, Chemical Engineer,  
Fishery Technological Laboratory,  
Branch of Commercial Fisheries,  
U. S. Fish and Wildlife Service,  
College Park, Md.



## WEIGHT CHANGES DURING THE COOKING OF FISH STICKS

The booming fish-stick industry is producing approximately 50 million pounds of sticks a year and with the increased competition in this new product, processing costs have become of increasingly great importance. The processing of the fish sticks is a relatively complex procedure. Close control is required at all stages in the operation to prevent waste and consequent losses in time and money. In addition to weight losses in cooking, other losses may be incurred during the operation of sawing the sticks from frozen blocks of fish fillets, during the batter-dipping and bread-ing operations, and during the packaging of the finished sticks. This report of observations and of research results on a pilot-plant scale of fish-stick manufac-ture will point out some means of minimizing losses during the processing, and in particular during the cooking of the fish sticks.



Frozen fish fillet blocks being cut into uniform fish sticks in a modern conveyor-belt-equipped plant.

In general, the following precautions are suggested to prevent large losses and at the same time to maintain production of an appealing product. Since the weight and shape of the stick is determined, to a large extent, by the initial operation of

sawing the sticks, careful and continuing attention should be paid to the accuracy with which the sawing blades are set. By this practice, a maximum yield per pound of purchased raw material may be obtained. In addition, closer tolerances can be set for the "fill" of packages.

Further, the increase in weight of fish sticks, due to the adherence of breading, is determined by the consistency of the batter. Once a satisfactory batter is obtained, all subsequent mixes should be made in the same proportions. Breakage of the soft, cooked fish stick during the packaging operation can be reduced by the employment of responsible personnel and by the constant supervision of the foremen. Broken sticks, while salable, bring a lower price per pound than do the intact fish sticks. An understanding of the factors involved in the changes in weight occurring during the actual cooking process is necessary to eliminate this source of possibly substantial losses during operation.



Fish sticks are passed through a batter by conveyor belt prior to being breaded.

Fishery Technological Laboratory indicated that, under adequately engineered conditions, the following factors, in the main, determined the weight changes occurring during the cooking process:

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Cooking time.</li> <li>2. Temperature of the cooking oil.</li> </ol> | <ol style="list-style-type: none"> <li>3. Composition of the breading material.</li> <li>4. Condition of the cooking oil.</li> </ol> |
|--|--|

Frozen sticks, each very close to 25 grams in weight, were dipped into a batter (6 parts of water to 4 parts of commercially-prepared dry batter mix), and were allowed to drain on a screen. They were then rolled in either a dry commercially-prepared breading material or in mixtures of the commercial material containing varying amounts of a type of commercially-prepared bread crumbs. These operations caused an increase of  $25 \pm 5$  percent in the weight of each stick owing to the adherence of the batter and breading.

The variously breaded sticks were then cooked in cottonseed oil maintained at  $360^{\circ}$ ,  $375^{\circ}$ ,  $390^{\circ}$ , and  $405^{\circ}$  F. The cooking times were at predetermined intervals between  $\frac{3}{4}$  of a minute and 3 minutes, inclusive. The results of the study on sticks prepared with straight commercial breading are shown in table 1. Observations of the sticks were made at frequent intervals during the several cooking periods under study to determine the rate and type of changes occurring. During the first few seconds in the hot oil, the sticks increased slightly in weight, evidently due to the absorption of oil by the breading. After the breaded sticks had been immersed in the oil for approximately one minute, the oil commenced to "boil" due to



Cooked fish sticks being packed in institutional packages prior to freezing and storage.

the escape of water vapor from the sticks. The sticks examined at this time were thawed but were still very cold. The sticks left in the hot oil for periods greater than about 1 minute showed losses in weight which increased approximately linearly with the increase in cooking time.

Table 1 - Effect of Cooking Temperature and Time on Changes in Weight of Fish Sticks during Deep-Fat Frying

Cooking Time	Weight Changes <sup>1/</sup>			
	Cooking Temperature (° F.)			
	360	375	390	405
Seconds	(Percent) . . . . .			
45	+2	+1	+3	+1
60	+1	-1	-1	-1
75	+1	-1	-2	-1
90	-5	-4	-5	-6
120	-6	-9	-6	-
150	-17	-	-	-
180	-24	-	-	-

<sup>1/</sup>Expressed as parts gained or lost in weight by 125 parts of breaded, cooked fish sticks prepared from 100 parts of fish.

The data in table 1 show that the effect on weight caused by varying the cooking oil temperature in the narrow range of temperature studied (360° to 405° F.) is relatively slight. The length of the cooking period was the most important single factor in determining the loss of weight in fish sticks during the cooking operation.

In commercial production the processors cook their sticks as nearly as possible to a constant predetermined color. Since higher oil temperatures shorten the time required to obtain the desired color, higher oil temperatures considerably reduce the weight losses involved in the cooking of fish sticks.

The effect of adding bread crumbs to the standard commercial breading material on weight losses during cooking is shown in table 2. The bread crumbs, owing to the occurrence of complex heat-induced chemical reactions, brown far more rapidly than do wheat cereal-based mixtures. Further, the rate of browning was determined by the bread-crumb/breading ratio and by the oil temperature used. With the exception of the fish sticks prepared with a commercial breading material and of those prepared with bread crumbs alone, all sticks in this study were judged to be of good color shade. The former were considered to be too light and the latter to be of too dark a shade. With this consideration in mind, the data in table 2 show that, as a result of the shorter immersion times necessary, losses in weight during cooking were minimized when bread crumbs were used as a part of the breading mixture.

The data in table 2, however, seem to indicate that fish sticks prepared from bread crumbs alone undergo a greater loss in weight than do sticks containing only the commercial breading mix and cooked under identical conditions. Those sticks prepared from mixtures of breading and bread crumbs, as might have been expected, undergo intermediate losses in weight.

The "condition," or the time in use, of a particular lot of cooking oil had a small effect on the weight changes in the sticks during cooking. The amount of oil which could be extracted from fish sticks increased with the "condition" of the oil. With fish sticks prepared from both breader mix and from breader mix containing bread crumbs, the older and thus the more viscous the cooking oil, the greater was the

Table 2 - The Effect of Addition of Bread Crumbs to Standard Breading Material on Changes in Weight of Fish Sticks during Deep-Fat Frying

Bread Crumb-Breading Material Ratio <sup>1/</sup>	Weight Changes <sup>2/</sup>			
	Cooking Temperature (° F.)			
	3/360	4/375	5/390	5/405
(Percent) . . . . .				
0.0	-5	-1	+3	+1
0.33	-3	-5	+2	0
0.66	-5	-4	0	-1
1.0	-10	-11	-1	-2

<sup>1/</sup>Proportions of bread crumbs added to standard breading material.  
<sup>2/</sup>Expressed as parts gained or lost in weight by 125 parts of breaded, cooked fish sticks prepared from 100 parts of fish.

<sup>3/</sup>Cooking time was 90 seconds.

<sup>4/</sup>Cooking time was 75 seconds.

<sup>5/</sup>Cooking time was 45 seconds.

amount of oil absorbed. Fish sticks cooked in fresh oil contained about 8 percent oil while those prepared in old oil contained about 9.5 percent of absorbed oil.

A processor, therefore, may, by careful control of the cooking time, the oil temperature, the breading composition, and the "condition" of the oil, so regulate his processing as to bring about very little or no loss in weight in his fish sticks during the cooking operation.

--J. Holston, Chemist,  
Fishery Technological Laboratory,  
Branch of Commercial Fisheries,  
U. S. Fish and Wildlife Service,  
East Boston, Mass.



### FLOW CHART of the COMMERCIAL FISHERIES-1954

CATCH  
**4.7**  
BILLION  
POUNDS

	<u>ROUND WEIGHT</u>	<u>MARKETED WEIGHT</u>
	Marketed Fresh	
695,000,000 Lbs.		626,000,000 Lbs.
547,000,000 Lbs. FILLETS (Fresh & Frozen)		172,000,000 Lbs.
281,000,000 Lbs. FROZEN (Not Fillets)		206,000,000 Lbs.
85,000,000 Lbs. Cured		60,000,000 Lbs.
1,121,000,000 Lbs. CANNED		795,000,000 Lbs.
		<u>MEAL</u>
1,971,000,000 Lbs.		479,000,000 Lbs.
		<u>OIL</u>
		156,000,000 Lbs.
		<u>CONDENSED</u>
		<u>FISH SOLUBLES</u>
		172,000,000 Lbs.
		<u>HOMOGENIZED</u>
		<u>CONDENSED FISH</u>
		57,886,000 Lbs.
		<u>WASTE from</u>
653,000,000 Lbs. Fresh & Processed		
		<u>Fish used for</u>
		<u>Byproducts</u>

NOTE:--THE ROUND AND MARKETED WEIGHTS SHOWN ABOVE DO NOT INCLUDE IMPORTED ITEMS PROCESSED IN THE UNITED STATES. THE MARKETED WEIGHTS LISTED DO NOT INCLUDE FRESH BAIT, FRESH ANIMAL FOOD PREPARED FROM WASTE, SHELL PRODUCTS, OR OTHER MISCELLANEOUS BYPRODUCTS.

# TRENDS AND DEVELOPMENTS

## Additions to the Fleet of U. S. Fishing Vessels

A total of 18 vessels of 5 net tons and over received first documents as fishing craft during January 1955--38 vessels less than in the same month last year. In the Gulf section only 3 vessels were documented for the first time as compared to 35 during the same period a year ago, the Bureau of the Customs reports. The Chesapeake States, South Atlantic States, and Alaska each had 4 additions to their fishing fleets, followed by the Gulf section with 3, the Pacific section 2, and the Middle Atlantic section one.

Section	Vessels Obtaining Their First Documents as Fishing Craft, January 1955		
	January 1955	January 1954	Total 1954
	Number	Number	Number
New England . . . . .	-	-	23
Middle Atlantic . . . . .	1	-	15
Chesapeake . . . . .	4	8	93
South Atlantic . . . . .	4	5	119
Gulf . . . . .	3	35	313
Pacific . . . . .	2	4	117
Great Lakes . . . . .	-	1	6
Alaska . . . . .	4	3	27
Hawaii . . . . .	-	-	1
Puerto Rico . . . . .	-	-	2
Unknown . . . . .	-	-	1
Total . . . . .	18	56	717

Note: Vessels have been assigned to the various sections on the basis of their home port.



## American Samoa

TUNA CANNERY RESUMES OPERATIONS: The Pago Pago, American Samoa, tuna cannery resumed operations at the beginning of December 1954 following the arrival of the first two vessels of a new Japanese charter fleet. The second vessel had 40 tons of fish aboard on arrival, reports the January 1955 Pacific Islands Monthly.

Within five days, 4,500 cases of tuna were ready for export and work was proceeding at the rate of about 15 tons of fish canned per day.

Two other fishing vessels have been chartered to replace two lost en route from Japan to Samoa, and the fleet this year consists of six vessels.



## California

SOUTHERN CALIFORNIA "FISH WEEK." The period March 13-19 was proclaimed as "Southern California Fish Week" by the Southern California Fisheries Association, and was officially recognized as such by the Los Angeles Municipal Government. Sales of fresh and frozen fishery products to both retail and institutional consumers were pushed in an integrated promotion instituted by the Southern California Fisheries Association in its first annual "fish week."

The Southern California Fisheries Association is a relatively young fisheries organization, but it has recognized the necessity of being "promotion minded" in order to maintain a place in the highly competitive food merchandising field. The Association planned this "fish week" as only the first phase of a continuing effort to

increase the consumption of fishery products in Southern California. Special membership assessments financed this publicity.

The Association used specific plans for drawing consumer attention to fishery products as a delicious high-protein, low-calorie, and economical food, during the March 13-19 period. These included "paid advertising" in 22 Southern California newspapers and by 54 radio "spots." Through its public relations counsel the Association arranged for courtesy plugs on 22 Southern California radio and TV programs, many of which were possible because of a "tie-in" with a new released record entitled "The Fish." Approximately 300 exterior posters were displayed on Los Angeles area buses. Special menu "clip-ons," and "tents," emphasizing fishery products, were made available to Southern California restaurants. The program also included newspaper and trade journal advertisements, point-of-sales promotion in retail stores, and public utilities announcements.

The U. S. Fish and Wildlife Service extended its cooperation to the Southern California Fisheries Association with the services of an experienced Fishery Marketing Specialist who aided the project. Service assistance was also given in enlisting the cooperation of the major retail grocery chains and drive-in restaurants of Southern California along with the food editors of the major newspapers, radio, and TV stations. In addition, the Service representative made nearly a dozen personal appearances on various local and coast-network radio and TV programs in connection with "fish week" as a public service representative.



### Cans--Shipments for Fishery Products, January-December 1954

 Total shipments of metal cans for fish and sea food during January-December 1954 amounted to 109,202 short tons of steel (based on the amount of steel consumed in the manufacture of cans), compared to 103,501 short tons in the same period a year earlier. Larger packs of canned tuna and pilchards in 1954 accounted for the increased shipments for that year.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



### Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY DEPARTMENT OF DEFENSE, JANUARY 1955: Fresh and frozen fishery products purchases for the military feeding of the U. S. Army, Navy, Marine Corps, and Air Force by the Army Quartermaster Corps in January 1955 amounted to 2.1 million pounds, valued at \$0.9 million (see table). This was an increase of 3.6 percent in quantity and 5.6 percent in value as compared with December 1954 purchases, and greater by 56.5 percent in quantity and 44.0 percent in value than purchases in January 1954.

Purchases of Fresh and Frozen Fishery Products by Department of the Army (January 1955 and 1954)

QUANTITY		VALUE	
January		January	
1955	1954	1955	1954
(Million Pounds)		(Million Dollars)	
2.1	.9	.9	.6

An average price of 41.4 cents per pound was paid by the Army Quartermaster Corps for fresh and frozen fishery products purchased in January 1955, compared with 40.6 cents in December 1954 and 45.0 cents per pound in January 1954.

In addition to the purchases of fresh and frozen fishery products indicated above, the Armed Forces generally make some local purchases which are not included in the above figures. Therefore, actual purchases are somewhat higher than indicated, but it is not possible to obtain data on the local purchases made by military installations throughout the country.



### Gulf Exploratory Fishery Program

DEPTH RANGE OF RED SHRIMP FOUND TO VARY WITH SEASON BY "OREGON" (Cruise 29): A change in depth range of deep-water red shrimp in the Gulf of

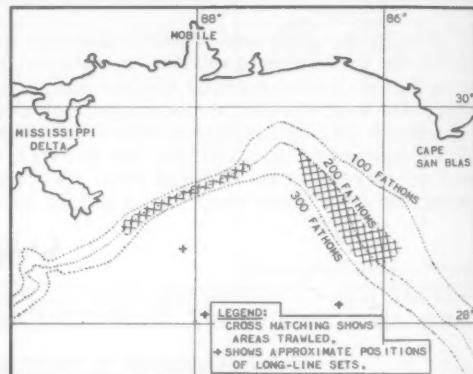


Packing headless red shrimp on the Service's exploratory fishing vessel Oregon.

at the bottom were between 48° and 50° F. Drags made in areas of warmer or colder bottom temperatures showed a rapid decrease in catch rate. Catches made in the favorable temperature range were uniform throughout the area in contrast to the summer months when there has been some evidence of concentration.

Catch rates averaged 90 pounds of 12-count heads-on red shrimp per 3-hour drag using an 80-foot balloon trawl, but were proportionately higher for 4-hour drags in around-the-clock operations. The largest catch made was 150 pounds of heads-on shrimp. Drags made between 160-200 fathoms caught another species of deep-water shrimp (*Penelopsis megalops*) at rates of approximately 50 pounds per drag. These shrimp are considerably smaller than the red shrimp averaging approximately 35 shrimp heads on per pound. Except for size this species appears to be as desirable as the larger form (*Hymenopenaeus robustus*).

Thirty-four trawling stations were made in depths of 160-270 fathoms along the continental slope between the Mississippi Delta and Cape San Blas. Three-hour drags were made during the early part of the cruise but it was found that 4-hour drags were more practical and that trawling could be carried on through a 24-hour period with an apparent increase in hourly catch rate. The average catch rate at



Approximate location of exploratory fishing activities during Cruise 29, Feb.-Mar., 1955, of the M/V Oregon.

Mexico for the late winter and early spring was found by the Oregon on a 19-day cruise ending at Pascagoula, Miss., March 14, 1955. Previous dragging in the summer and fall in the northeastern Gulf had given the best results at depths of 200-210 fathoms but on this cruise the greatest concentrations were found at depths of 240-260 fathoms where water temperatures

the best depth for dragging produced only  $3\frac{1}{4}$  100-pound boxes of heads-off shrimp per 24-hour period so the quantities caught were relatively low in comparison with good shrimp fishing in shallow water. It should be noted, however, that better concentrations have been found on earlier cruises of the Oregon.

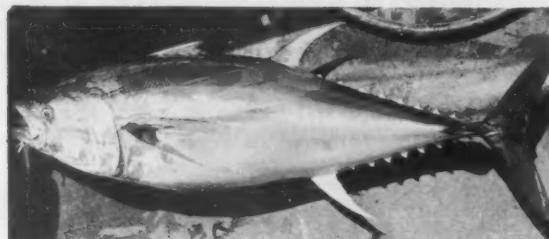
Good trawling bottom was found throughout the cruise except close to the Mississippi River Delta where soft mud and patches of live coral were encountered. At depths of 240-260 fathoms the net was used on a single 700-fathom half-inch wire rope with a 25-fathom bridle. Mud ropes and special doors did not appear necessary.

The drags made in the 240-260-fathom depth range produced whiting (*Merluccius magnoculus*) and hake (*Phycis* sp.) from one- to four-pound size at a rate of 300-500 pounds per drag.

In addition to the trawling work, three tuna long-line sets were made in the offings between the Mississippi Delta and Cape San Blas using deep-water trawl scrap fish as bait. One 300-pound bluefin tuna was captured. This tuna was in prespawning condition with immature eggs.

The Oregon was due to leave Pascagoula on a four-week long-line fishing cruise on April 5. Sets were planned at intervals of about 60 miles beginning in the central Gulf of Mexico and extending through the Yucatan Channel into the northwestern Caribbean.

This is to be the first of a series of cruises scheduled to give information on the continuity of fishable stocks of yellowfin tuna in the Gulf and northwestern Caribbean. An additional objective was to learn more about the schools of very large bluefin tuna that have appeared in the northern Gulf of Mexico during February and early March. The appearance and capture of the bluefin coincided with an abrupt decline in yellowfin catches during the last week in February and of course a primary objective will be to look for information that would help explain this decline.



A 300-pound bluefin tuna caught in March 1955 by the Oregon in the northern Gulf of Mexico with long-line gear.



### Haddock Fillet Promotion Campaign Progresses Well

The cooperative industry-Government haddock promotional campaign, which was first announced by Secretary of the Interior McKay on January 13 rapidly gained momentum in the following weeks.

Five days after the program's announcement, six major food trade organizations and associations promised their support and a special bulletin on the haddock supply was sent to the 7,000 members of the National Restaurant Association. Also, arrangements were made for the mailing of a special bulletin on haddock to 13,500 schools in New York, Pennsylvania, New Jersey, Virginia, Massachusetts, West Virginia, Kentucky, and Ohio.

In the week of January 18-25, the U. S. Fish and Wildlife Service made additional arrangements for the immediate distribution of special haddock supply bulletins to 10,250 schools in the following states:

Maine  
New Hampshire  
Vermont

Connecticut  
Rhode Island  
North Carolina

Maryland  
Delaware  
Indiana

Illinois  
Missouri

Special bulletins on the haddock supply situation were sent to approximately 4,000 institutions in these states.

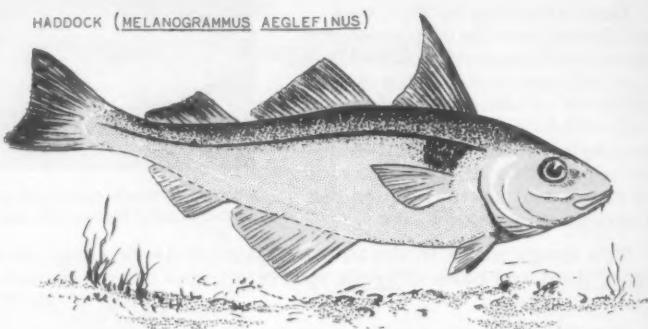
Through the cooperation of the U. S. Department of Agriculture approximately 2,200 newspapers, TV, and radio food editors, institutional buyers, and Extension Service personnel of the New England area were sent a bulletin featuring haddock fillets. In cooperation with the Department of Agriculture approximately 600 similar persons in the Midwest were sent a special Service-prepared bulletin on haddock.

Major frozen-food distributors throughout the Northeastern and mid-Central states received a special letter from the Director of the Fish and Wildlife Service advising them of the cooperative industry-Government haddock campaign.

Approximately 1,000 newspaper, radio, and TV food editors in the Northeastern and mid-Central states were sent special information about the haddock marketing program which could be readily adapted for use in their columns or on the air.

Many personal calls by Service personnel were made by January 25 on TV and newspaper food editors to encourage them to feature haddock. These calls were made in Boston, New York, Philadelphia, Baltimore, Pittsburgh, Cleveland, Akron, Toledo, and Indianapolis. While in these cities, Service personnel also contacted frozen fish distributors to acquaint them with the campaign. Within the next few days, all major cities in the so-called "haddock belt" were similarly covered.

Meanwhile, the industry prepared news material, some point-of-sale material, cookbooks, and generally publicized the program through its contacts.



## Maryland

FINFISH CATCH RECORD SYSTEM REVISED: A revised finfish catch-record program was introduced to Maryland's fishing industry on January 1, 1955. Designed by the Maryland Departments of Tidewater Fisheries and Research and Education to meet the growing needs of State conservation administrators, biologists, and economists, the new record system will provide a more complete, more detailed, and speedier inventory of the catch of commercial fish taken in Maryland waters.

Since 1944 the Department of Research and Education at Solomons has been solely responsible for the collection, tabulation, and analysis of commercial fish records. Under the new program, the Department of Tidewater Fisheries at Annapolis will undertake the collection of such reports from licensed net fishermen. Under the new system the fishermen have a revised record book requiring a report for each day's fishing, listing the pounds of each species of fish caught, water area

fished, and where the fish were sold. Monthly record sheets are to be returned at the end of each three-month period. All records, inquiries, and correspondence in regard to the catch program should be addressed to the Maryland Department of Tidewater Fisheries, State Office Building, Annapolis, Md. Records received from the fishermen will then be forwarded to the Maryland Department of Research and Education for tabulation and analysis, according to the latter agency's February 1955 Maryland Tidewater News.

As further refinements are incorporated in the record system, both agencies will strive to make the catch data available monthly or seasonally rather than, as in previous years, on an annual basis. As in the past, individual fisherman's records will be maintained on a confidential basis and will not be used outside of the collecting agencies. The Maryland agencies will continue to cooperate with the U. S. Fish and Wildlife Service and the records will be processed by the Service's automatic tabulating unit as usual.



### New England Exploratory Fishery Program

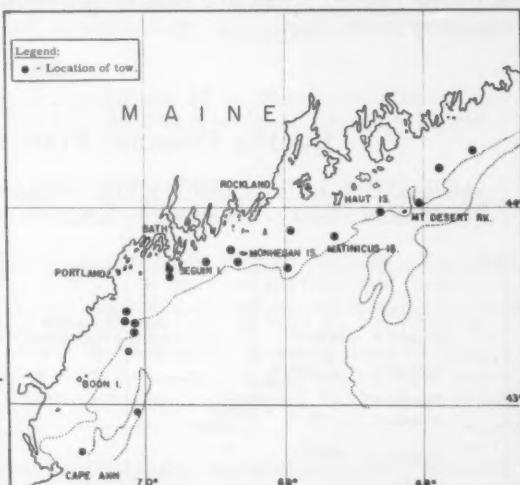
**SHRIMP EXPLORATIONS CONTINUED IN GULF OF MAINE BY "DELAWARE"**  
(Cruise 3): Northern shrimp were not taken in commercial quantities in any of 19 tows made by the Service's exploratory fishing vessel Delaware in the Gulf of Maine on a 10-day cruise completed at Boston, Mass., on February 13.

The greatest number were taken in 50 fathoms of water off Wood Island, Me. Virtually all of the northern shrimp taken were egg-bearing females with a mean length of 105 mm. (4, 2 inches). This approximates the sizes taken in the previously existing fishery.

This was the third cruise of a series designed to determine the present abundance in the winter months of northern shrimp (Pandalus borealis) in waters which formerly supported a commercial fishery.

A total of 19 otter-trawl tows was made, using a standard No. 41 otter trawl, with a  $2\frac{1}{2}$ -inch cotton mesh liner in bellies and cod end. Ten of the tows were made in, or in close proximity to, areas which supported a winter fishery in the middle and late 1940's. Nine tows were made between these areas, or in exploration of suitable bottoms.

The cod end and belly of one trawl net was lost when it filled with mud. Three fishing days were lost due to stormy weather.



Cruise 3 of the M/V Delaware



## North Pacific Exploratory Fishery Program

**PETRALE SOLE TO BE TAGGED BY "JOHN N. COBB" OFF VANCOUVER ISLAND:** A special cruise to tag petrale sole in the "Esteban Deep" off the west coast of Vancouver Island was commenced when the Service's exploratory fishing vessel John N. Cobb sailed from Seattle, Wash., on March 21. The operation was to be carried out in cooperation with the State of Washington Department of Fisheries and the Fisheries Research Board of Canada.

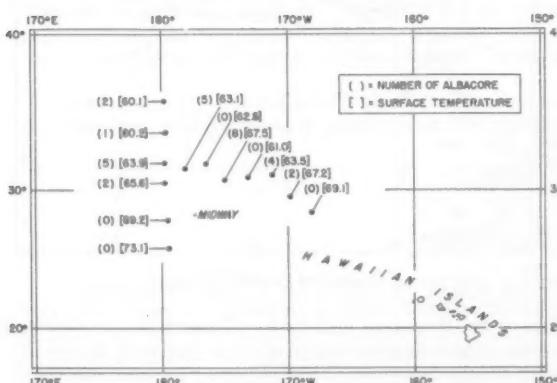
Standard western otter trawls will be used to catch the petrale sole, and special techniques and gear will be employed in an attempt to reduce the high mortality rate experienced in previous tagging operations in the "Esteban Deep" by the State. The high mortality was thought to have been the result of extreme pressure changes on the petrale sole as they were brought up from depths as great as 1,200 feet.

Catches of petrale sole, a most highly-prized bottomfish, have dwindled on both Canadian and United States grounds in recent years. The "Esteban Deep" petrale sole grounds, discovered accidentally in 1953 by United States trawlers fishing for Pacific ocean perch, has produced the largest catches of petrale sole ever taken in the history of the Washington trawl fishery. Fishermen and scientists alike believe that the petrale sole taken in "Esteban Deep" are a part of the same stocks which are fished in other areas during the summer months. This opinion is based on results of previous tagging by the State of Washington and Canada. The work carried out by the John N. Cobb will help to determine the necessity of giving the species regulatory protection.



## Pacific Oceanic Fishery Investigations

**ALBACORE TUNA FOUND OVER BROAD AREA NORTHWEST OF HAWAII BY "JOHN R. MANNING"** (Cruise 23, Part II): Albacore tuna were found over a broad area north of Midway Island by the Service's research vessel John R. Manning on a 30-day cruise to determine the distribution and abundance of this species in that area.



The cruise, completed at Honolulu on February 6, 1955, covered the area between 29° and 32° N. latitude from 160° W. to 180° longitude--more than 100,000 square miles of ocean.

The cruise was the latest in a series aimed at mapping the winter extent of the central North Pacific albacore, a fishery resource hitherto unexploited by United States fishermen. The albacore is the highest priced of the tuna, and the domestic production falls far short of the demand. The opening up of fishing grounds for this species within operating distance of Hawaii may mean the eventual development of a new fishing fleet based in the islands, and it is anticipated that the mainland tuna industry will also show a keen interest in the results of these explorations.

The albacore tuna caught weighed up to 70 pounds, and were captured mainly on long lines (flag lines), although a few small ones were taken at the surface by

trolling. Most of the albacore taken were tagged and released alive in the hope that subsequent recaptures may shed additional light on the migrations of this species, which apparently traverses the whole North Pacific.

The John R. Manning put in briefly at Pearl and Hermes Reef, an extensive shoal area 75 miles southeast of Midway, in order to reconnoiter the supply of live bait there. Large mullet and akule were plentiful, numerous turtles and seals were seen, and a large population of goony birds was nesting on the reef, but no supply of small fish suitable for tuna bait appeared to be present.

First a section line was fished on  $180^{\circ}$  in order to determine the latitudes at which albacore occurred. Subsequent fishing was confined to those latitudes and the albacore were traced east to  $168^{\circ}$  W. Thirteen stations were fished during this portion of the cruise. (Part I of this cruise was executed in December 1954 and a report published in Commercial Fisheries Review, February 1955, p. 34.)

There were 6 stations on the  $180^{\circ}$  meridian and 7 eastward to  $168^{\circ}$  W. longitude between  $28^{\circ}$  N. and  $32^{\circ}$  N. latitude (see figure). Sixty baskets (30 each of 5- and 15-fathom float-line gear) were set at each station with the exception of two, when only 40 baskets were set because of bad weather.

Albacore were caught at 8 of the 13 stations but not in large numbers. The best catch was at  $30^{\circ}42'N.$ ,  $175^{\circ}W.$ , where 8 fish were caught. The total catch for the 13 stations was: 29 albacore, 13 big-eyed tuna, 1 short-nosed spearfish, 99 great blue sharks, 2 mako sharks, 20 lancetfish, 1 dolphin (C. hippurus), and 1 pelagic sting ray.

The albacore varied greatly in size, ranging from  $3\frac{1}{2}$  to 76 pounds with no uniformity of size at any of the stations. The big-eyed tuna weighed between 43 and 96 pounds.

According to chemical sounding tubes, the deepest hooks of the 5-fathom gear fished at an average depth of 319 feet while the 15-fathom gear fished at 387 feet.

Trolling was done for 2 hours along the long-line set at each station. Two hours of surface trolling was done at 8 stations, and 1 hour each of surface and deep trolling at 5 stations. The only fish taken by trolling were two albacore weighing around 4 pounds which were caught at the surface on the station at  $30^{\circ}59'N.$ ,  $171^{\circ}14'W.$  where the surface temperature was  $63.5^{\circ}F.$  No fish were taken by deep trolling, which was conducted at a speed of around 4-5 knots using 4 hooks baited with sardines. The bait was invariably torn and battered when retrieved, but none gave any indication that fish had struck.

The recording thermograph, operated continuously during the cruise, showed a very gradual change in surface temperature to  $27^{\circ}N.$  on  $180^{\circ}$ , when a sudden drop from  $72^{\circ}F.$  to  $70^{\circ}F.$  was recorded, followed by a steady but faster decline northward. At around  $33^{\circ}N.$  latitude irregular rises and falls in temperature were noted, and the resultant drop was from  $64^{\circ}F.$  at  $31^{\circ}49'N.$  to  $60^{\circ}F.$  at  $33^{\circ}50'N.$  latitude.

Surface temperature at stations at which albacore were taken ranged from  $60.1^{\circ}-67.5^{\circ}F.$ , but the best fishing occurred at temperatures of  $63.1^{\circ}-67.5^{\circ}F.$

At the southern end of the  $180^{\circ}$  section where no albacore were taken there was a sharp thermocline at 280 feet. North of  $31^{\circ}41'N.$ , where winter conditions prevailed, there was no perceptible thermocline.

Stomachs were preserved from 8 albacore and field examinations were made of the stomachs of 4 big-eyed tuna, 1 dolphin, and 18 lancetfish. There were some-

what greater amounts of food in the stomachs of these lancetfish as compared to those caught in December 1954 (Part I of this cruise) along 160° W. longitude. Ovaries were collected from 1 albacore. Scales and vertebrae were taken from 9 albacore for age and growth studies.

Morphometric measurements were made on 9 albacore, 1 big-eyed tuna, 1 short-nosed spearfish, 1 great blue shark, and 1 mako shark.

A total of 22 albacore and 7 big-eyed tuna were tagged and released.

A pelagic sting ray was preserved whole in formalin and returned to the laboratory at Honolulu.

A brief bait survey made on Southeast Island of Pearl and Hermes Reef in the Leeward Island group disclosed the presence of only a very small amount of round herring (Spratelloides delicatulus). No other species suitable for bait were noted.

No surface schools or bird flocks were seen outside the immediate vicinity of islands.

The sea and weather conditions were generally good throughout this cruise.

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**SKIPJACK TUNA FOUND SCARCE IN WINTER OFF LINE ISLANDS BY "CHARLES H. GILBERT"** (Cruise 19): Skipjack tuna were unusually scarce along the course of the Service's research vessel Charles H. Gilbert on a cruise to most of the atolls of the Line Islands group, about 1,000 miles south of Hawaii. The cruise began at Honolulu on January 20 and ended at the same port on February 19, 1955.

The primary mission of the voyage was to scout for schools of skipjack tuna (aku), the small striped tuna which is the mainstay of Hawaii's tuna fishing industry in the summer but which is scarce at this time of the year in the local waters where the sampan fleet operates. Rarely were more than one or two schools of skipjack sighted each day, and with no concentrations of any potential importance to commercial fishermen. Around the Line Islands, where schools of yellowfin tuna are generally present close to the reefs, only small fast-moving schools were seen. Attempts to attract these tuna with artificial bait were unsuccessful. A secondary mission of the cruise was to test the effectiveness of various artificial substitutes for the scarce live-bait fish upon which the Hawaiian tuna catch depends.

Intensive scouting was done during every day at sea. Two days were spent south of Oahu, four days en route to Johnston Island, and five more days en route to Palmyra Island. Part of each of 10 days was then spent scouting off the Line Islands and on the return to Honolulu 6 more days were spent. There was a total of 233.2 hours of scouting and only 9 skipjack tuna, 5 yellowfin tuna, 23 unidentified, and 2 mixed schools of fish were seen. Most of these were near Palmyra Island. None of the skipjack and only 2 of the yellowfin schools responded to the live bait. All schools were wild and frequently the birds dispersed before the school could be approached.

The most promising artificial bait was tested on surface schools of yellowfin near the Line Islands. This bait consisted of tuna juices solidified with agar to which was added a small amount of artist's glitter to simulate fish scales. This was cut into strips approximately  $2 \times \frac{1}{2} \times \frac{1}{8}$  inch thick. This artificial bait was tried alone and after live bait on all possible schools, including both yellowfin and skipjack. In no case was there evidence of response to the artificial bait.

A bait reconnaissance was made in the Line Islands area. Small quantities of mullet were found at Palmyra and Fanning Islands. These averaged 5-8 inches in length and usually were found in groups of only 1 to 5 buckets on sandy bottoms in water less than 2 feet deep. Thus, they were difficult to catch in quantity and the best catches ran to only about 15 buckets per hour of baiting time. No baiting was done at Christmas Island where it is now prohibited by the British Government.

Experiments with tagging procedures on skipjack and yellowfin were planned, but too few of both species were caught for experimentation. Stomachs of troll-caught skipjack and troll-caught yellowfin were preserved for tuna food and behavior study.

The Gilbert field party serviced a weather station established earlier by U. S. Fish and Wildlife Service personnel on Christmas Island and picked up the weather data accumulated since the last time a POFI vessel put in there. The weather station at Fanning Island was also inspected by the party.

This operation also was intended to locate and obtain data on the poisonous properties of food and sport fish suitable for introduction into Hawaiian waters. Good collections were obtained and numerous specimens of snappers and groupers were brought back both frozen and alive to Honolulu.



### Pacific Salmon Investigations

SALMON UPSTREAM MIGRATION STUDIED WITH UNDERWATER SONIC DEVICES: The U. S. Fish and Wildlife Service is using the latest engineering developments in underwater sonic devices to study adult salmon behavior in their upstream migration. Production models of the "Sea Scanar" have been modified to aid biologists in observing fish movements under various hydraulic conditions.

An automatic tracking receiver and a small signal generator have been developed to enable the biologists to track closely the movements of an individual salmon. The signal generator is attached to the fish and the receiver automatically "homes" to the signal. In this way the position of the fish in the stream or fishway is recorded on a calibrated cathode ray tube. This equipment makes possible a determination of the rate, depth, and route of migration of adult salmon, plus their reaction to obstacles along the migration route.



Observations of salmon behavior will be made in the vicinity of fishway entrances and collection systems of dams, fishway exits, and in the fishways.



### Saltonstall-Kennedy Act Fishery Projects

FISHERIES ADVISORY COMMITTEE MEETING CALLED: The Fisheries Advisory Committee, authorized under the Saltonstall-Kennedy Act (68 Stat. 376), will hold its first meeting on April 28 and 29 in Washington, D. C., in the Department of the Interior Building, Secretary of the Interior McKay announced April 5.

Under a provision of the Saltonstall-Kennedy Act, the Secretary of the Interior was authorized to appoint a group of experts from the domestic fisheries and fishery products industry to advise him on industry problems embraced by the new legislation. The Advisory Committee consists of 19 representatives of all segments of the United States fisheries. The members have been appointed to serve until June 30, 1957.

Designed to strengthen the United States commercial fisheries as a whole, the Saltonstall-Kennedy Act provides that an amount equal to 30 percent of duties collected under the customs laws on fishery products shall be transferred annually for three years from the Department of Agriculture to the Department of the Interior. Expenditures for any one year may not exceed \$3 million.

In order to get the program under way as rapidly as possible after funds became available on July 1, 1954, Secretary McKay approved a number of projects which were considered by the industry to require immediate attention. In most instances these projects paralleled programs already under way or which had been postponed previously because of lack of funds.

Assistant Secretary of the Interior Orme Lewis will be the presiding officer during the meetings on April 28 and 29. John L. Farley, Director of the Fish and Wildlife Service which administers the Saltonstall-Kennedy Act, will report to the Advisory Committee on the progress and accomplishments to date of the projects already initiated by the Service.

The Department has received some 75 suggestions and requests for assistance from various industry and research groups, and from fishery associations. A program for the remainder of the current fiscal year ending June 30, 1955, will be discussed, as well as one for next fiscal year.

The Committee's advice will be sought on policy, rules, and regulations pertaining to requests for assistance. Procedures will be outlined which the Committee will follow in performing its functions. A system will be established on priorities by types and areas for proposed projects.

Those named to the Committee were listed on page 37 of the February 1955 issue of Commercial Fisheries Review.

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**SERVICE OPENS NEW FISHERY STATISTICAL OFFICE:** A new fishery statistical office was opened recently by the U. S. Fish and Wildlife Service in Beaufort, S. C. In addition, activities are being expanded at existing offices in Beaufort, N. C., and Coral Gables, Fla.

Under the terms of the Saltonstall-Kennedy Act (68 Stat. 376), which is designed to give special aid to the American commercial fishing industry, funds have been allocated to expedite the Service's work of collecting and issuing statistics on the catch of fish and shellfish, the value of the catch, and the employment of men, fishing craft, and gear in the fisheries.

Statistical information is acknowledged to be the basis of most fishery research and must be available before practical management programs can be attempted. The increased funds now available will make possible much more of this type of work. During the hearings held prior to the passage of the Saltonstall-Kennedy Bill, expert witnesses from the fishing industry from all parts of the country were in full accord that more work should be done by the Service to extend the statistical coverage of the interior sections of the country and to speed up the release of all statistical data. These statistics are also invaluable to state and Federal agencies in their regulatory work.

The office at Beaufort, S. C., in charge of Melvin H. Low, will make a general canvass of the fisheries of South Carolina.

Additional statistical offices, financed through Saltonstall-Kennedy Act funds, will be opened shortly in Providence, R. I.; Solomons, Md.; Aransas Pass, Galveston, and Brownsville, Tex.; Brunswick, Ga.; Fort Meyers and Key West, Fla.; Biloxi and Pascagoula, Miss.; and Houma and Morgan City, La. Statistical activities will be expanded in the Service's San Pedro, Calif., office.

Note: See Commercial Fisheries Review, February 1955, p. 38.

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**SERVICE LETS CONTRACTS FOR SOUTHERN OYSTER STUDIES:** The signing of three contracts for oyster research to be conducted in southern states under the Saltonstall-Kennedy Act (68 Stat. 376) was announced by Secretary of the Interior McKay on March 10. The contracts have been let to Florida State University, Louisiana State University, and Tulane University by the U. S. Fish and Wildlife Service which will supervise the work.

Studies aimed at developing improved techniques for handling, processing, freezing, packaging, and storing southern oysters and oyster products will be made. The over-all objective is to broaden the market base for these commodities.

The Florida State University contract calls for \$12,400 to be allocated over a 12-month period for studying southern oysters from the standpoint of variations in composition and nutritive value; investigating the effects of environment, freezing, and processing on these oysters; developing new oyster products by such treatments as blanching, smoking, and breading; preparing special oyster dishes for taste panels and frozen-storage tests; and investigating the fat content of these oysters as it affects quality during refrigerated or frozen storage.

The contract let to Louisiana State University earmarks \$10,000 for a 12-month project entailing a study of variations in southern oysters due to different seasons and different producing areas, an investigation of freezing and frozen storage in connection with these oysters, development of a quality test for fresh and frozen southern oysters, and a study of oyster changes due to the presence of undesirable organisms.

The Tulane University contract calls for \$7,600 to be available over a 12-month period for research on the "bleeding" (loss of liquor) of shucked southern oysters and for studies of "pigmentation" (color spots) found in these oysters. The work will entail probes into the physiological factors involved in bleeding, and efforts will be made to determine why the pigmentation develops.

\* \* \* \* \*

**SERVICE TO INVESTIGATE SCALLOP AND WHITING FISHERIES:** Biological investigations of New England's scallop and whiting fisheries have been initiated with funds provided by the Saltonstall-Kennedy Act (68 Stat. 376). The research will be under the direction of the Woods Hole, Mass., Laboratory of the North Atlantic Fisheries Investigations.

Scallop research will be conducted to ascertain the reasons for the apparent depletion.

\* \* \* \* \*

**SERVICE ALLOTS MORE FUNDS FOR FLORIDA RED TIDE WORK:** An additional \$33,000 to expedite the U. S. Fish and Wildlife Service program to combat

the red tide on the Florida west coast has been allotted by Secretary of the Interior McKay. This money will be used during the remainder of the current fiscal year to charter planes and vessels and to purchase chemicals for large-scale control experiments. Additional personnel will also be needed to analyze scientific data which is accumulating rapidly.

These additional funds are available under the terms of the Saltonstall-Kennedy Act (68 Stat. 376), which is designed to give special aid to the American commercial fishing industry.

With \$20,000 previously allocated from Saltonstall-Kennedy funds and \$50,000 from regular congressional appropriations, a total of \$103,000 in Federal funds is being used in fiscal year 1955 to ascertain how quickly the red tide work can be successfully concluded.

In the past two years the Service has intensified its efforts to determine the combination of environmental factors which "trigger-off" blooms of Gymnodinium brevis, the minute marine organism which causes extensive fish kills in waters along Florida's west coast.

The need for additional funds became apparent in January 1955 when members of the Service's Washington staff and the scientific staff of the red tide investigations met at the Fort Myers, Fla., laboratory to make a critical examination of the progress of the Federal research program. The most striking feature brought out in the research review was the discovery made in the Service's laboratory at Galveston, Tex., that metallic copper in extremely small quantities is highly toxic to G. brevis.

After further experimental work in the laboratory, metallic copper in the form of large screens and possibly copper ore tailings will be tried on a field scale to determine its control effectiveness as a substitute for the more expensive copper sulfate.

In the meantime control experiments using copper sulfate as the poison agent to curb the red tide microbe will be continued as the most expedient method of possible control so far developed.

Such experiments, however, are becoming increasingly expensive because the Service must depend largely upon charter and rental boats and planes to achieve useful results. Since G. brevis continues to be present in Florida waters, control experiments must be increased beyond those originally anticipated.

Methods of increasing the effectiveness of patrol along the red tide areas to detect outbreaks in their early stages were also discussed during the conference. The Service is now arranging for one of its float planes to be assigned to Fort Myers to determine if a rapid and effective means of patrolling and sampling the area can be done by air.



### South Carolina

MORE PRECOOKED SEAFOODS BEING PROCESSED: Many fish processing plants in South Carolina have increased their production of frozen precooked fishery products during the past year, reports the Service's Fishery Marketing Specialist stationed in South Carolina. Plants which formerly packed only such items as frozen shrimp have now turned the major part of their production to precooked fro-

zen items, such as precooked breaded shrimp, oysters, crabs, etc. Some plants now precook 75 percent and more of their total production of frozen seafoods.



## Sport Fishing License Sales Continue Upward Trend

Sport fishermen and hunters in the United States reached the record-breaking total of 32,654,199 individuals in the past fiscal year and they paid almost \$85 million for fishing and hunting licenses and Federal duck stamps, the U.S. Fish and Wildlife Service reported March 1.

State	Paid License Holders			Total Licenses Issued <sup>1</sup>	Total Cost <sup>2</sup> To Fishermen For All Licenses Issued
	Resident	Nonresident	Total		
Alabama	206,625	18,949	225,574	231,474	\$ 268,641
Arizona	90,006	42,818	132,824	132,824	359,527
Arkansas	264,873	131,909	396,782	396,782	744,524
California	1,240,604	15,400	1,256,004	1,256,004	3,789,836
Colorado	300,000	104,457	405,457	405,457	831,198
Connecticut	100,313	4,337	107,650	107,650	374,698
Delaware	8,515	1,714	10,229	10,229	23,499
Florida	239,529	99,694	338,623	338,623	905,825
Georgia	400,928	6,513	407,441	416,034	270,336
Maho	178,724	65,024	243,748	248,690	664,008
Illinois	768,544	20,199	788,743	788,743	871,760
Indiana	554,232	36,584	590,816	618,384	665,989
Iowa	388,941	15,127	404,068	404,068	579,049
Kansas	100,377	4,024	107,401	232,399	477,152
Kentucky	334,247	80,557	414,904	414,904	876,452
Louisiana	178,995	65,055	205,049	205,049	241,346
Maine	126,461	72,979	199,440	199,440	616,949
Maryland	96,000	20,983	116,988	116,988	211,949
Massachusetts	215,707	7,276	222,983	245,365	642,025
Michigan	852,788	307,137	1,159,925	1,581,719	2,266,848
Minnesota	871,964	305,953	1,277,917	1,337,311	3,093,691
Mississippi	51,970	7,210	208,180	208,180	306,668
Missouri	510,149	51,082	561,231	561,231	1,240,566
Montana	185,391	36,696	222,087	222,087	416,896
Nebraska	222,865	9,539	232,404	232,404	358,893
Nevada	28,397	26,831	55,228	60,469	199,859
New Hampshire	75,728	48,648	124,376	129,616	409,107
New Jersey	138,125	19,995	148,120	224,380	577,744
New Mexico	72,105	37,584	110,289	118,404	376,726
New York	781,444	42,120	813,064	866,680	1,811,046
North Carolina	317,010	25,730	342,740	349,436	647,466
North Dakota	73,903	1,306	75,209	78,384	144,242
Ohio	837,746	47,508	885,254	885,254	1,762,688
Oklahoma	354,597	54,177	408,774	408,774	868,002
Oregon	291,982	28,153	320,135	322,571	1,190,084
Pennsylvania	704,337	27,147	731,484	731,484	1,764,772
Rhode Island	19,892	485	20,375	26,392	47,361
South Carolina	200,232	16,732	216,954	319,530	385,321
South Dakota	100,232	27,233	127,565	127,565	279,689
Tennessee	648,261	120,219	768,480	815,456	781,040
Texas	417,379	6,193	423,772	426,337	716,272
Utah	133,733	7,295	141,028	148,939	425,728
Vermont	72,200	33,707	105,907	106,027	246,064
Virginia	351,194	8,842	359,736	425,542	583,524
Washington	464,166	20,352	484,518	485,537	1,429,265
West Virginia	72,211	7,537	194,937	221,359	380,073
Wisconsin	739,495	141,197	1,000,992	1,002,776	2,215,366
Wyoming	121,291	62,815	184,106	189,909	340,340
<b>TOTALS</b>	<b>15,921,772</b>	<b>2,557,041</b>	<b>18,580,813</b>	<b>19,504,030</b>	<b>\$38,927,735</b>

<sup>1</sup>Includes general resident and nonresident fishing license fees, permits, tags, stamps, and such fees from licensees as distributed by some states. There were 360,070 free hunting and fishing licenses issued by 18 states.

<sup>2</sup>Gross cost to the fisherman for various types and categories of licenses issued by the respective states for the privilege of fishing for and/or possessing fish.

license statistics which is being used for the first time this year. In previous years the Service has reported the total number of all licenses purchased, including permits, special licenses, stamps, etc. This total represented duplications, since a hunter might buy, in addition to his general license, a quail stamp and a deer stamp. Or a fisherman in some states might buy a special trout permit.

Apportionment of Federal aid funds to the states for fish and wildlife restoration programs is based upon the number of paid license holders and not upon the total of all licenses issued.

The data in the table have been arranged in five columns. The first three columns cover, as nearly as can be determined, the number of paid license holders, consisting of residents, nonresidents, and the total for each state. The fourth column presents an enumeration of all types of licenses issued by the states to sportsmen, such as general hunting and fishing licenses, big game, and special types of issuances, such as trout stamps, woodcock permits, special area licenses, free licenses to the aged, veterans, etc., special



Fishing, as in past years, remained the most popular outdoor sport, with 18,580,813 men and women paying \$38 million for all categories of state licenses, permits, and stamps in the fiscal year ending June 30, 1954 (see table).

In the preceding fiscal year, in the category of paid license holders, fishermen outnumbered hunters 17,867,922 to 13,997,155. Fees from fishing licenses in 1953 totaled \$35 million as compared with \$45 million (including \$4 million for duck stamps) collected from hunters.

The Fish and Wildlife Service has developed a new system of reporting hunting and fishing

gear permits (archers, fish houses, etc.), and others. The number of these special licenses is indicative of the growing trend toward more highly specialized and regulated hunting and fishing.

The fifth column gives the gross cost which sportsmen pay for the right to indulge in their favorite sport. The totals in the fifth column include fees for the general licenses, and for all special permits, tags, and stamps, except the Migratory Waterfowl Hunting Stamps which are issued by the Federal Government and not by the states.



### U. S. Foreign Trade

**EDIBLE FISHERY PRODUCTS, DECEMBER 1954:** United States imports of fresh, frozen, and processed edible fish and shellfish in December 1954 amounted to 49.4 million pounds (valued at \$14.1 million), according to a Department of Commerce summary tabulation (see table). This was a decrease of 21 percent in quantity and 14 percent in value as compared with November imports of 62.6 million pounds (valued at \$16.4 million). Compared with a year earlier, December 1954 imports were lower by 9 percent in quantity and 8 percent in value.



Exports of processed edible fish and shellfish (excluding fresh and frozen) in December 1954 totaled 6.2 million pounds (valued at \$1.3 million)--an increase of 7 percent in quantity but 7 percent lower in value as compared with November exports of 5.8 million pounds (valued at \$1.4 million). December 1954 exports were higher by 63 percent in quantity and 30 percent in value than a year earlier.

Items	United States Foreign Trade in Edible Fishery Products, December 1954 With Comparisons					
	Dec. 1954		Dec. 1953		Year 1953	
	Quantity	Value	Quantity	Value	Quantity	Value
..... (In Millions of Lbs. & \$) .....						
Imports:						
Fish & shellfish: Fresh, frozen, & processed <sup>1</sup>	49.4	14.1	54.2	15.4	724.7	193.2
Exports:						
Fish & shellfish: Processed <sup>1</sup> only(excluding fresh and frozen)	6.2	1.3	3.8	1.0	58.9	14.4

<sup>1</sup>/ Includes pastes, sauces, clam chowder and juice, and other specialties.

\* \* \* \* \*

**IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, 1954:** United States imports of groundfish fillets, frozen tuna, and fish meal during the year 1954 were substantially greater than in 1953, according to preliminary data compiled from Bureau of the Census records. Most of the other principal fishery products imports showed relatively little change. The 1954 exports of canned salmon and sardines (not in oil), and fish oils were also considerably above those of 1953.

Imports: Frozen tuna imported during December 1954 totaled 8.7 million pounds, compared with 2.1 million in that month a year ago. This brought the total for the year 1954 to a record of 123.4 million pounds, an increase of 30 percent over 1953. Of the 1954 imports, 98 million pounds were received from Japan of which 56 million pounds were albacore tuna. Peru, the next leading supplier, contributed 20.3 million pounds.

Imports of canned tuna amounted to 31.6 million pounds during 1954, about 9 percent less than in 1953. Of this 28.6 million pounds were from Japan--10 million pounds of which were albacore tuna. Bonito canned in oil and in brine totaled 15.4 million pounds, almost entirely from Peru.

Groundfish and ocean perch fillets imported during 1954 reached a record of 135.3 million pounds. This was an increase of 48 percent over 1953 and 26 percent above the previous record year 1952. Imports of cod fillets in 1954 totaled 82.1 million pounds; ocean perch fillets, 23.5 million pounds; and haddock and other species, 29.7 million pounds. The principal supplying countries were Canada, 86 million pounds; Iceland, 37 million; Norway, 4.7 million; West Germany, 3.6 million; and Denmark, 2.7 million pounds. Imports of other fillets and steaks during 1954 totaled 48 million pounds as compared with 51.3 million pounds in 1953. These consisted of 8.9 million pounds of swordfish fillets; 4.6 million pounds of halibut and salmon fillets and steaks; 10.3 million pounds of flounder fillets; 6 million pounds of wolffish (sea catfish), and 11.5 million pounds of fillets of fresh-water fish.

United States imports of fresh and frozen salmon amounted to 32.9 million pounds during 1954. This compared with 27.4 million pounds imported during 1953. Canned salmon imports in 1954 totaled 11.4 million pounds, slightly below those of the previous year.

The 1954 imports of canned sardines not in oil were far below those of the previous year. Only 12.7 million pounds were imported in 1954, compared with 22.5 million pounds in 1953. Canned sardines in oil imports of 21.7 million pounds were only slightly below 1953.

Shrimp imports during 1954 totaled 41.5 million pounds. Fresh and frozen lobster imports amounted to 41.4 million pounds. Imports for both these products were only slightly below 1953. Canned lobster imports of 3.1 million pounds in 1954 were about 1 million pounds less than the previous year. Imports of canned crab meat totaled 2.9 million pounds during 1954, also about 1 million pounds under the year earlier.

The 1954 imports of fish meal also reached a new record with 145,777 tons, compared with 131,473 tons in 1953. Principal sources of fish-meal imports were Canada with 39,740 tons; Norway, 34,154 tons; Angola, 30,130 tons; and Peru, 17,596 tons.

Exports: United States exports of canned salmon showed considerable gains during 1954, principally to the United Kingdom. Exports of canned salmon totaled 7.2 million pounds as compared with 2.3 million pounds in 1953. Of the 1954 total, 3.8 million pounds went to the United Kingdom. United States canned salmon has been practically out of that market since 1949.

Exports of canned sardines also showed substantial gains during 1954 to reach a total of 16.4 million pounds. In 1953, 9.2 million pounds were exported. Principal destination in 1954 were the Philippines which took 5.1 million pounds and Latin American countries.

Canned mackerel exports totaled only 1.5 million pounds in 1954, compared with 5.3 million in 1953.

Fish oils exported during 1954 reached a record of 140.8 million pounds, about 32 percent greater than the previous record year 1953.

\* \* \* \* \*

SHRIMP IMPORTS, 1954: United States shrimp imports (fresh, frozen, canned, and dried) from all countries in 1954 totaled 41.5 million pounds, a decrease of 4

Table 1 - U. S. Shrimp Imports (Fresh, Frozen, Canned, and Dried), 1950-54<sup>1/</sup>

Country of Origin	1954	1953	1952	1951	1950
(In 1,000 Pounds)					
Mexico . . . . .	34,886	36,767	33,863	39,575	39,653
Panama . . . . .	3,661	3,943	3,903	1,875	291
Ecuador . . . . .	548	-	41	-	-
Argentina . . . . .	529	227	5	1	-
Peru . . . . .	446	352	1	2/	-
Japan . . . . .	440	389	108	49	58
Colombia . . . . .	391	225	21	78	-
Norway . . . . .	153	489	257	88	69
Other Countries . . . . .	488	708	271	158	127
Total . . . . .	41,542	43,100	38,470	41,824	40,198

1/ Mostly frozen shrimp.

2/ Less than 500 pounds.

percent from 1953 imports of 43.1 million pounds, according to statistics obtained from the Bureau of the Census (table 1). Mexico again was the principal supplier of shrimp (mostly frozen) to the United States, and shipped 84 percent of the total as compared with 85 percent in 1953 and 99 percent in 1950. Although the total Unit-

Table 2 - U. S. Shrimp<sup>1/</sup> Imports from Mexico by Customs Districts, 1950-54

Customs District	1954	1953	1952	1951	1950
(In 1,000 Pounds)					
New York . . . . .	-	47	464	1,099	692
Florida . . . . .	-	1	326	308	614
New Orleans . . . . .	1,317	447	2,619	2,552	1,842
Galveston . . . . .	5	2,214	833	1,335	68
Laredo . . . . .	12,047	9,373	6,703	5,173	3,257
El Paso . . . . .	119	-	-	2	-
Arizona . . . . .	19,834	21,656	17,813	24,436	23,046
San Diego . . . . .	814	1,163	1,668	1,708	1,640
Los Angeles . . . . .	544	637	591	286	3,096
San Francisco . . . . .	120	78	380	353	372
Chicago . . . . .	-	1,091	2,193	2,060	4,044
Minnesota . . . . .	-	-	-	30	130
Colorado . . . . .	-	-	42	78	198
St. Louis . . . . .	-	-	2	109	429
Washington . . . . .	82	37	16	39	-
Other Customs Districts . . . . .	4	23	112	7	225
Total . . . . .	34,886	36,767	33,762	39,575	39,653

1/ Mostly fresh and frozen.

ed States imports of shrimp in the past five years has fluctuated little, poor fishing on the Mexican west coast has reduced shipments from Mexico. Mexico ships almost its entire production to the United States. Other countries have taken up the slack and increased their imports of shrimp to the United States.

The largest decrease of shrimp imports from Mexico was in shipments through the Arizona and Galveston Customs Districts (table 2); while shipments through the Laredo and New Orleans Customs District increased substantially.

\* \* \* \* \*

MISCLASSIFICATION OF IMPORTS OF PEARL ESSENCE AND FISH-SCALE

EXTRACT: Investigation has revealed that the data for imports classified under the Bureau of the Census Schedule A commodity number 8420 290, "Chemical pigments, n.s.p.f., " during the period January-September 1954 incorrectly included data on imports of pearl essence and fish-scale extract which are classifiable under Schedule A commodity number 8420 270, "Pearl essence."

The following table summarizes the revisions which were found to be necessary in the January-September 1954 import statistics as a result of these misclassifications:

Schedule A Commodity Number	Commodity Description	As Published		As Received	
		Quantity	Value	Quantity	Value
Lbs.	US\$	Lbs.	US\$		
8420 270	Pearl essence . . . . .	16,788	196,216	24,673	276,362
8420 290	Chemical pigments, n.s.p.f.	53,866	89,148	45,981	9,002

The above changes will be presented in further detail in the "Revisions to Previous Months' Reports" section of a future issue of Report No. FT 110, United States Imports of Merchandise for Consumption, Commodity by Origin.

Beginning with the October 1954 statistics, steps were taken which are intended to prevent a recurrence of these errors. In view of the amount of work necessary to investigate the data for years prior to 1954, no attempt will be made to determine the extent of misclassifications, if any, in these data, states the February 1955 Foreign Trade Statistics Notes of the Bureau of the Census.



### Washington

CHINOOK SALMON FEEDING AND MIGRATORY HABITS STUDIED: An environmental research study into the feeding and migration habits of fall chinook salmon has been started by the State of Washington Department of Fisheries on the Deschutes River.

Under the supervision of the Chief Biologist, the research staff will attempt to pinpoint the movement of both juvenile and adult chinooks between the Main River and Budd Inlet, with special attention to hold-up periods in Deschutes Lake and rate of progress through the fishway system at Tumwater Falls. The project is roughly parallel to the type of migrant and stream production studies conducted at Minter Creek. Assessment also will be made of the type and quantities of food organisms present in the river and lake during the juvenile feeding stage.

Traps already have been installed at the head of the Falls and in Percival Creek, and others will be placed later at Points in the lake.

In October 1954, 2,700 chinooks were placed above the Falls and the progeny of these spawners are now in their emergent stage or approaching it. Only a few fry have been captured, and the main outward migration is not expected until late spring.

In addition, the Department plans to release 1,000,000 marked chinook fingerlings in the Deschutes from stock being reared at the Green River Salmon Hatchery. The latter has been the donor for the Deschutes since the run was artificially established several years ago.

One long-range objective of the project will be to measure feeding competition between species of salmon and the effect it has, if any, on the ability of the Deschutes

and similar rivers to produce chinooks at a maximum level. To date only chinook salmon have been planted in the river or allowed to ascend the fishways, and this may have contributed to the high productiveness which has characterized the run. When other species are introduced study data will enable the Department to better assess the effects of feeding competition and, if necessary, manipulate escapement to keep the populations in balance.

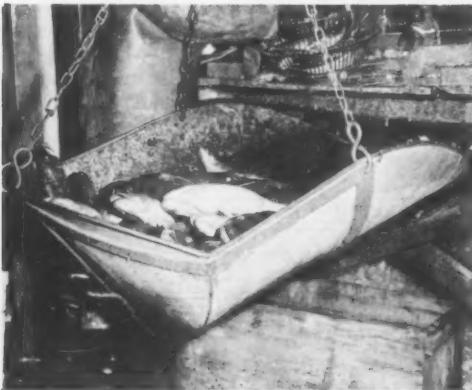
The study has area-wide importance since the Deschutes chinooks have proved to be a mainstay of the fall and winter "Blackmouth" fishing season in lower and middle Puget Sound. It will be conducted by stream biologists with the assistance of the resident biologist for the Olympia area, and will continue for at least three years.



### Wholesale Prices, February 1955

Wholesale prices for edible fishery products dropped from January to February due to a light demand for fresh and frozen fish and shellfish. Supplies were

generally moderate in February 1955. February prices were also down from a year earlier. The over-all index for edible fish and shellfish (fresh, frozen, and canned) in February 1955 was 101.8 percent of the 1947-49 average (see table)—3.7 percent less than in January and 5.0 percent below a year earlier.



A lot of sea bass being weighed. At Hampton, Va., dragger fish is landed, sorted by species, weighed, boxed, iced, and shipped by truck to northern markets.

decline in prices for haddock and Western halibut.

A sharp decrease in the fresh haddock fillet price was almost offset by a substantial increase in shrimp prices, but the over-all February 1955 average index for the fresh processed fish and shellfish subgroup was down 1.9 percent from January. Shrimp production was light in February 1955 and the demand good. Oyster prices were lower than in January. February 1955 prices for this subgroup were 7.4 percent below a year earlier due to lower haddock fillet and shrimp prices.

In the frozen processed fish and shellfish subgroup, the February 1955 index was up 9.2 percent from January because of higher prices for flounder fillets and shrimp. Frozen haddock fillet prices were lower than in January, while ocean perch fillet prices remained the same. February 1955 prices, however, were well below a year earlier (10.1 percent), with all items priced lower except flounder fillets which were priced slightly higher.

Lighter inventories of salmon and Maine sardines were responsible for a 2.9-percent increase from January to February in the index for canned fishery products.

Tuna prices remained unchanged. California sardine prices were reintroduced in the index since there was a light pack in 1954. February 1955 canned fish prices when compared with a year earlier were up 3.2 percent because of a substantial increase in canned salmon prices; tuna and Maine sardine prices were well below a year earlier.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, February 1955 and Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices <sup>1</sup> / (\$)		Indexes (1947-49=100)			
			Feb. 1955	Jan. 1955	Feb. 1955	Jan. 1955	Dec. 1954	Feb. 1954
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) . . . . .					101.8	2/105.7	100.5	107.2
Fresh & Frozen Fishery Products: . . . . .					103.0	2/111.6	102.9	114.1
Drawn, Dressed, or Whole Fish/fish:					100.4	2/123.9	107.4	116.5
Haddock, lge., offshore, drawn, fresh . . . . .	Boston	lb.	.08	.16	80.8	159.3	97.3	119.8
Halibut, West., 20/30 lbs., drsd., fresh or froz.	New York	lb.	.26	.28	79.4	85.6	87.7	94.9
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.53	.56	119.7	125.6	129.2	115.2
Whitefish, L. Superior, drawn, fresh . . . . .	Chicago	lb.	.65	.51	161.1	125.2	109.1	151.2
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.48	.71	96.0	143.5	114.2	148.6
Lake trout, domestic, No. 1, drawn, fresh . . . . .	Chicago	lb.	.65	.51	133.2	103.5	129.1	131.1
Yellow pike, L. Michigan & Huron, rnd., fresh . . . . .	New York	lb.	.53	.50	117.3	117.3	90.3	140.7
Processed, Fresh (Fish & Shellfish): . . . . .					104.3	2/106.3	101.3	112.6
Fillets, haddock, sml., skins on, 20-lb. tins . . . . .	Boston	lb.	.30	.45	100.4	153.1	91.9	132.7
Shrimp, lge. (26-30 count), headless, fresh . . . . .	New York	lb.	.58	.53	91.7	83.8	84.2	101.2
Oysters, shucked, standards . . . . .	Norfolk	gal.	4.88	5.00	120.6	123.7	123.7	120.6
Processed, Frozen (Fish & Shellfish): . . . . .					97.4	89.2	89.2	108.3
Fillets: Flounder (yellowtail), skinless, 1-lb. pkg. . . . .	Boston	lb.	.40	.38	104.7	98.2	98.2	103.4
Haddock, sml., skins on, 1-lb. pkg. . . . .	Boston	lb.	.29	.29	89.4	90.2	90.2	111.4
Ocean perch, skins on, 1-lb. pkg. . . . .	Boston	lb.	.28	.28	111.8	111.8	111.8	114.8
Shrimp, lge. (26-30 count), 5-lb. pkg. . . . .	Chicago	lb.	.56	.47	86.8	72.5	72.5	104.5
Canned Fishery Products: . . . . .					100.0	2/ 97.2	96.8	96.9
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . . . .	Seattle	case	20.70	19.70	109.6	104.4	104.4	93.9
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs. . . . .	Los Angeles	case	12.90	12.90	93.0	93.0	93.0	102.4
Sardines, Calif., torn, pack, No. 1 oval (15 oz.), 48 cans/cs. . . . .	Los Angeles	case	7.30	7.30	85.2	85.2	3/	3/
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs. . . . .	New York	case	7.20	6.70	76.6	71.3	71.3	87.3

<sup>1</sup>Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

<sup>2</sup>/Revised because there were slight adjustments of weighting for fish and shellfish and the subgroups.

<sup>3</sup>/Not available.



#### SCHOOL FOR FISHERMEN

A three-week twine net-weaving course for fishermen and prospective fishermen was held at Lockeport, N. S., by the Nova Scotia Department of Trade and Industry. Similar courses are being held in other fishing areas of the Province. The Department also operates a permanent school on navigation at Lunenburg, and also has a mobile unit for providing instruction on marine engines.



**International**  
**INTERNATIONAL LABOR ORGANIZATION**

**GOVERNING BODY APPROVES STUDY OF FISHERMEN'S WORKING CONDITIONS:** The Governing Body of the International Labor Organization, which held its 128th session in Geneva, Switzerland, approved on March 2 proposals for a study of fishermen's working conditions submitted earlier by a committee of 12 experts, reports a March 2 release from the United Nations at New York. It was agreed that the Governing Body would ask member governments whether they favor establishing international standards on the following points of interest to the fishing industry: age of admission to employment, medical examinations, working contracts, and accident insurance.

**INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION**

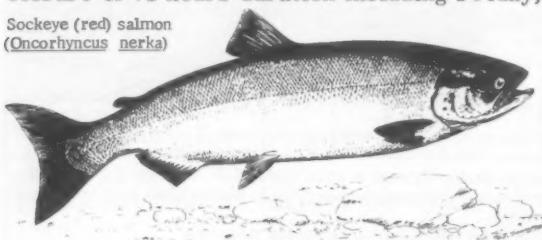
**Sockeye Salmon Regulations for 1955:** A summary of recommendations for regulations governing the 1955 sockeye fishing season as approved by the International Pacific Salmon Fisheries Commission on the basis of the considerations undertaken at Vancouver, British Columbia, January 8, 1955, is as follows:

**Respecting United States Convention Waters:** (1) There shall be a weekly closure of 72 hours duration including Friday, Saturday, and Sunday of each week in all United States Convention waters from June 30 to August 1 in the year 1955. The weekly 72-hour closure shall commence at 12:01 a. m. Friday for purse seines and reef nets and at 6:00 p. m. Thursday for gill nets.

(2) There shall be a closure of 48 hours duration including Saturday and Sunday in all United States Convention waters from August 1 to August 8 in the year 1955. The 48-hour closure shall commence at 12:01 a. m. Saturday, August 6, for purse seines and reef nets and at 6:00 p. m. Friday, August 5, for gill nets.

(3) There shall be a weekly closure of 36 hours duration including Saturday of each week in all United States Convention waters from August 8 to August 29 in the year 1955. The weekly 36-hour closure shall commence at 4:00 p. m. Friday for purse seines and reef nets and at 6:00 a. m. Saturday for gill nets.

**Respecting Canadian Convention Waters:** (1) There shall be a weekly closure of 72 hours duration from June 30 to August 1 and a weekly closure of 48 hours duration from August 1 to August 22 in Canadian Convention waters known as Areas 19, 20, 21, and 23.



(2) There shall be a weekly closure in all other Canadian Convention waters (Areas 17, 18, and District No. 1) of 78 hours duration from June 30 to August 9, 96-hour weekly closures from August 9 to August 30, 72-hour weekly closures from August 30 and extending to September 15, and a continuous closure from 8:00 a. m. September 15 to 8:00 a. m. September 20.

(a) In that part of District No. 1 above Pattullo Bridge the weekly closure shall cease 4 hours later than in that part below Pattullo Bridge irrespective of the length of any of the above specified closures.

(3) The opening and closing hours in all areas of Canadian Convention waters shall be substantially the same as those in effect last year.

Respecting the International Waters of the High Seas: The Commission approved a regulation ordering a weekly closure of 72 hours beginning June 30 and extending to August 1 and a weekly closure of 48 hours beginning August 1 and extending to August 15 for the year 1955 in all Convention waters in the High Seas, the same being the waters between the 48th and 49th parallels lying westerly of a line drawn between Bonilla Point and Tatoosh Island and outside the territorial limits of both Canada and the United States.

General: The Commission declared that no one shall buy, sell, or have in his possession any sockeye salmon taken in any of the Convention waters during the time when fishing for such salmon is prohibited in such waters.

#### TERRITORIAL WATERS

UNITED NATIONS SEEKS INTERNATIONAL LEGISLATION ON CONTINENTAL SHELF AND FISHERY CONSERVATION: Under the titles of "Draft Articles on the Continental Shelf" and "Economic Development of Fisheries and the Question of Fishery Conservation and Regulation," the United Nations' General Assembly considered at its 1954 session two related topics of a nature far more urgent than a cursory glance at their names might imply, a recent United Nations press release pointed out.

As discussion in the U. N. International Law Commission, the Assembly's Legal Committee, and numerous other forums has amply demonstrated over a number of years, both subjects are of vital interest not only to countries with maritime interests, but also to the world in general.

Concerning the fisheries question, for instance, the Law Commission said in its most recent report on the matter that existing international law "provides no adequate protection of marine fauna against extermination." This, it pointed out, "constitutes a danger to the food supply of the world."

Color was given to this warning by the representative of one of the leading fishing nations of the world, Hans Andersen of Iceland, who told the Assembly's Legal Committee that during the last 30 years the catch had been growing smaller, despite improved fishing methods. For example, he said, a British trawler which in 1919 had an average daily catch of 3,400 pounds in the North Sea, caught a bare 1,500 pounds in 1937.

The kindred subject of the exploration and exploitation of the resources of the continental shelf (described in the Encyclopedia Britannica as "the term in physical geography for the submerged platform upon which the continental areas stand in relief") moved the International Law Commission to emphasize the importance of establishing international legislation which would "protect the paramount principle of the freedom of the seas and of the air space above them," while at the same time safeguarding the sovereign rights of the coastal states concerned. . . .

Both the continental shelf and the fisheries development question form part of the U. N. International Law Commission's comprehensive and complicated work of codifying the law of the high seas and of territorial waters, a labor upon which it has been engaged since its first session in 1949, and which is not yet finished.

In 1951 the Commission drew up provisional draft Articles upon both issues. It revised the Articles in 1953 in the light of comments received from governments, and passed them to the Assembly with the recommendation that action be taken upon them without waiting for the completion of the whole codification task. At its session that year, however, the Assembly decided not to deal with any aspect of the regimes of the high seas and territorial waters until the Commission had reported upon all the inter-related problems involved.

A year later, in 1954, a number of countries--including such maritime powers as Brazil, the Netherlands, the United Kingdom, and the United States--asked the Assembly to reconsider this decision. In the case of the continental shelf, they expressed the belief that the Assembly should delay substantive consideration of the draft Articles only until 1955, instead of indefinitely. The additional year (from 1954 to 1955), they said, should allow ample time for study by all governments.

In the case of the fisheries question, the countries asked immediate adoption of a resolution under which problems of the economics and conservation of high-seas fisheries would be referred either to the Food and Agriculture Organization of the U. N. or to a special governmental conference of experts. Pointing out that the matter embraced a number of specialized problems which could probably be solved only by economic and technical experts, they maintain that even if the Assembly were to delay its discussion of the draft Articles for a number of years, its eventual debate would be unlikely to be productive in character unless it had the views of such specialists before it.

Much of the subsequent debate in the Assembly's Legal Committee revolved around the central point of whether granting these requests on the two issues would prejudge the Law Commission's course of action on the remainder of its work.

On the continental shelf, the Committee, and subsequently the Assembly itself, finally approved a compromise proposal calling upon the Commission to finish its study of the world broad subject of the high seas, territorial waters, "and all related problems" in time for Assembly consideration in 1956.

Regarding the fisheries question, the requesting nations got their wish. The Assembly decided to recommend the holding of a world conference, opening on April 18, 1955, at the Rome Headquarters of FAO. Under the terms of the resolution, the conference will study "the problem of the international conservation of the living resources of the sea . . .," a term substituted for the original word "fisheries" in order to cover the whole area of marine life (whales, for instance) instead of limiting it to fish alone.

Throughout the debate in the Legal Committee, emphasis was laid on the fact that the conference was to be of a strictly technical nature which would not encroach in any way upon the Commission's work in the legal field, and the resolution itself stipulated that the conference should "make appropriate scientific

and technical recommendations" which would "not prejudge the related problems awaiting consideration by the General Assembly."

Definition of Continental Shelf: The eight draft Articles on the Continental Shelf drawn up by the Law Commission in 1953 include such provisions as proclaiming the right of the coastal states in question to explore and exploit the natural resources of the shelf, while at the same time forbidding them to engage in "any unjustifiable interference with navigation, fishing, or fish production," or to "prevent the establishment or maintenance of submarine cables."

One cardinal point is the definition of the term "continental shelf" itself. The draft Articles describe it as "the sea-bed and subsoil of the submarine areas contiguous to the coast, but outside the area of the territorial sea, to a depth of two hundred metres."

In its report, the Law Commission explained that the 200-meter limit had been fixed "because it is at that depth that the continental shelf, in the geological sense, generally comes to an end. It is there that the continental slope begins and falls steeply to a great depth."

During the Legal Committee's debate, however, some speakers pointed out that "the area of the territorial sea" to which the definition referred could not in fact be established until the Commission had completed its work on the subject of territorial waters. They cited this argument in support of their contention that it would be advisable to delay a decision until the whole study was finished.

International Fisheries Authority Proposed: The three draft Articles on Fisheries provide, among other things, for the establishment of an international authority within the framework of the United Nations. Its task would be to set up, at the request of any "interested state," systems regulating fisheries in any given area of the high seas "for the purpose of protecting the fishing resources of that area against waste or extermination."

The Articles also stipulate that any country which finds itself the only nation engaged in fishing activities in any particular area may itself set up regulation and conservation measures. Any two or more countries fishing in the same area may take similar action by mutual agreement. If difficulties arise, any one of the interested parties may submit them to the proposed international authority.

Emphasizing in its report the urgent necessity for international legislation on the fisheries conservation issue, the Law Commission pointed out that no government had expressed opposition to the suggested establishment of the authority. This, it declared, "is significant of the present state of opinion, and of the widely felt need for the removal of what is considered by many to be a condition approaching anarchy...."

Note: See Commercial Fisheries Review, January 1955, pp. 42-45; December 1954, pp. 45-47; June 1954, pp., 25-35.

#### TRADE AGREEMENTS

U.S.-ECUADOR TRADE AGREEMENT TO BE TERMINATED: Following conversations over a considerable period of time in Quito between representatives of the Government of Ecuador and the United States, the United States, in accordance with the provisions

of Article 19 of the reciprocal trade agreement signed by both countries in 1938, has notified the Government of Ecuador of its intent to terminate the agreement, according to a U. S. Department of State release dated February 8, 1955.

Termination will become effective on July 18, 1955, as provided in the 1938 agreement.

This action will not change the present rate of import duty on canned sardines applied by Ecuador, which was established January 1, 1954, at 6 sucres per net kilogram (18 U. S. cents per pound). The trade agreement rate on canned sardines which was 0.49 sucres per legal kilogram including containers and packaging (1.5 U. S. cents per pound) under the 1938 agreement, has not been effective in recent years due to the imposition by Ecuador of exchange surcharges and increased rates of duty. United States exports of canned sardines to Ecuador in 1953 totaled 1,298,998 pounds, valued at US\$284,366.

Representatives of the two countries are initiating conversations regarding the conclusion of a mutually satisfactory commercial arrangement in lieu of the reciprocal trade agreement scheduled to expire on July 18, 1955.



### Australia

RECORD SPINY LOBSTER CATCHES IN WESTERN AUSTRALIA: Record daily catches of white spiny lobster were reported as the Western Australian season got off to an early start on November 20, 1954, 10 days earlier than usual. Although rough weather in early December apparently chased the white spiny lobsters from the shallow coastal feeding grounds, red spiny lobsters were found in abundance in the deeper waters. Observers predicted a highly profitable season for the fishermen operating along about 140 miles of coastline from Freemantle north to Jurian Bay, states a January 5, 1955, U. S. consular dispatch from Perth.

Lack of shipping space to the United States delayed the beginning of the export season, but there were high hopes for equaling or bettering the previous year's results. In the 1953/54 season Western Australia accounted for about three-fourths of Australia's exports which brought dollar earnings of about US\$3.5 million. Recent Government statistics show that Western Australia produced 9.1 million pounds (live weight) of spiny lobster in 1953/54, and exported 3.2 million pounds of frozen spiny lobster tails and 61,518 pounds of boiled whole spiny lobsters.

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BRITISH ORDERS FOR CANNED TUNA SAVE AUSTRALIAN TUNA FISHING SEASON: British orders for 18,000 cases (48 7-oz. cans) of Australian canned tuna were obtained with the assistance of the Dept. of Commerce and Agriculture by the leading tuna cannery just in time to save the Australian tuna fishing season, reports the January 1955 Fisheries Newsletter, an Australian fishery periodical. The Australian canner had previously announced that it could not buy any more tuna, but when fishermen agreed to take 5 d. (4.6 U. S. cents) instead of 7 d. (6.5 U. S. cents) and previously 8 d. (7.4 U. S. cents) per pound, it agreed to buy up to 80 tons of fish a week to a ceiling of 500 tons. The canner will now require at least 400 tons of tuna to fill the United Kingdom order, and has also exported 256 tons of frozen tuna to the United States.

The tuna crisis was caused by lack of export orders for the canned product, falling prices in California for the frozen raw fish, and a carryover in the Australian market of the earlier  $3\frac{1}{2}$ -oz. pack. The more popular 7-oz. size is now being packed.

Of the 256 tons of frozen tuna exported to the United States, 94 tons were shipped in November and 100 tons in December 1954, both shipments for California canneries, and 62 tons were shipped in December to the United States east coast. The total export of 256 tons of frozen tuna was more than four times as much as the first export in 1949-50 when 60 tons were shipped, mostly to California but some to Vancouver and Honolulu.

The 1949-50 export and samples of the canned product established a market for Australian southern bluefin tuna, and if quality is maintained and prices steady, there seems to be no reason why valuable export trades should not be developed, both in the frozen raw material for the dollar market and in the canned product for others, according to reports. It is not practicable to export tuna canned in oil to the United States because of the United States tariff of 45 percent ad valorem; but there is no duty on the frozen fish.

\* \* \* \* \*

IMPORTS OF FISHERY PRODUCTS FROM RUSSIA, JULY-SEPT. 1954: Australian imports of fishery products from Russia during July-September 1954 consisted of canned salmon—260,579 pounds, valued at £A59,266 (US\$132,000); and canned crustaceans 92,101 pounds, valued at £A25,526 (US\$57,000). In addition, other fishery products valued at £A1,067 (US\$2,400) were imported from Russia during the period, reports a February 16 U. S. consular dispatch from Sydney.

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SHORE-BASED WHALING SEASON SUCCESSFUL IN 1954: Another successful Australian whaling season was concluded on October 22, 1954, when the newest of Australia's five shore-based whaling stations completed its quota. This new station, located at Byron Bay on the north Coast of New South Wales, commenced operating on July 29.

The full quota of whales was taken at each station as follows:



	Number of Whales
Point Cloates . . . . .	600
Carnarvon . . . . .	600
Albany . . . . .	120
Tangalooma . . . . .	600
Byron Bay . . . . .	120
Total . . . . .	<u>2,040</u>

At Tangalooma the quota was made up of 598 humpback whales and one blue whale, which in accordance with the international Whaling Convention counts as  $2\frac{1}{2}$  humpbacks. At all other stations humpback whales only were taken.

Australian Shore-Based Whaling Operations, 1951-54					
	Unit	1954	1953	1952	1951
Stations operating . . . . .	No.	5	4	4	2
Whales taken . . . . .	No.	2,040	2,001	1,787	1,224
Whales lost . . . . .	No.	0	0	7	4
Whales processed . . . . .	No.	2,040	2,001	1,780	1,220
Percentage of males . . . . .	%	59.1	62.1	62.8	74.5
Percentage of females . . . . .	%	40.9	37.9	37.2	25.5
Foetuses . . . . .	No.	78	84	65	18
Males . . . . .	Feet	39.4	38.5	39.7	40.2
Average length: Females . . . . .	Feet	40.5	40.7	40.5	40.5
Animals . . . . .	Feet	39.8	40.0	40.1	40.3
Oil production . . . . .	Barrels	100,068	102,354	91,360	56,051
Oil yield per whale . . . . .	Barrels	49.0	51.2	51.1	45.9

The five stations produced over 100,000 barrels of oil and 5,000 tons of meat meal in addition to which some 1,400 tons of dried whale solubles were produced in the new spray drying plant at Carnarvon. The total value of these products is approximately £1.6 million (US\$3.6 million). It is interesting to note the decrease in the average lengths and the decrease in oil yield shown during the 1954 season (see table). These decreases are due almost entirely to the changes which have taken place on the west coast of Australia.

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It should be borne in mind that Australian whaling operations are based on two separate stocks of whales, one of which migrates from the Antarctic to the west coast and the other from the Antarctic to New Zealand and the east coast of Australia. There does not appear to be any east-west movement of the whales at any stage and the stocks remain separate even in the Antarctic. Thus, in considering the effects of whaling on the stocks, conditions on the west coast and the east coast must be examined separately.

Whaling on the east coast was hampered by adverse weather during most of the season and at one stage a cyclone made it impossible for the chasers to operate for five days.



### Benelux Countries

CANNED SALMON TARIFF SUSPENSIONS RENEWED: Customs duties on canned salmon entering Belgium, the Netherlands, and Luxembourg, which have been suspended on a yearly basis since the common Benelux tariff came into force in 1948, will again be fully suspended until the end of 1955, reports the January 22, 1955, Foreign Trade, a Canadian Government publication.



### Canada

NEWFOUNDLAND FISHERIES SEEKING MORE UNITED STATES CAPITAL: The Chairman of the Newfoundland Fisheries Development Authority recently stated he was interested in obtaining more United States capital for investment in fish processing plants in Newfoundland, reports a January 28, 1955, U. S. consular dispatch from St. John's. He states that the good demand in the United States for Newfoundland fish sticks is growing and that with the expansion of frozen food outlets in the United States it can be expected to continue to grow. He said that the fish-processing capacity of Newfoundland plants is at present unable to supply this demand. Therefore, he is planning a trip to the United States to discuss the possibility of investment in such plants with men interested in the fish industry there.

The Chairman said that the Government had surveyed 31 suitable sites for such plants at various points around the Newfoundland coast. He explained that an average-size plant could be built for C\$1 million and that a small one would cost C\$350,000. He added that the Newfoundland Provincial Government was prepared to advance 50 percent of the capital for such an installation with repayment in 20 years at 5 percent. Some plants have already been installed with United States backing and the locally-owned plants have also increased their facilities.

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NEWFOUNDLAND FISHERIES TRENDS, 1954: The 1954 fishing year in Newfoundland was one of development, change, and experimentation in the fishing industry, a January 28, 1955, U. S. consular dispatch from St. John's points out. The trend toward industrialization seems to be established.

Frozen Groundfish Production: Frozen groundfish production in Newfoundland during 1954 was the greatest on record with a yield of about 53 million pounds, an increase of 54 percent over the previous year. A 15-million-pound increase in cod yield accounted for most of the gain. The production of haddock, hake, and pollock

was almost three times as high as in 1953, but ocean perch, flounder, and gray sole declined.

This increase in the frozen fish industry is chiefly attributed to the increase in United States demand for fish sticks and for fish in frozen-block form.

Freezing Facilities Expanded: As a result of increased demand for Newfoundland groundfish, new freezing plants were put into operation during 1954 at Twillingate, Greenspond, Witless Bay, Trepassey, and Long Harbour. In addition, the capacity of the Harbour Grace and Bonavista plants was increased. At the end of the year two other plants at Catalina and Grand Bank were under construction.

Fishing Capacity Increased: Newfoundland's fishing capacity was increased in 1954 by the addition of 7 vessels to the offshore fishing fleet. There were 28 draggers in operation during the year, compared with 26 in 1953. The fleet of long liners and Danish seiners was increased by 5 vessels.

These new developments enabled inshore fishermen to sell larger quantities of fresh fish, which made a significant contribution to the frozen fish production.

Lobster Fishery: The Newfoundland lobster season opened late in 1954 due to ice conditions on the northeast coast. Nevertheless, the lobster fishery was profitable with a catch of about 4.9 million pounds, or nearly half a million pounds over 1953. About 90 percent or 4.4 million pounds, was marketed alive. Lobster canning operations continued negligible.

Fish Meal: The output of fish meal was estimated at 18 million pounds, or nearly 19 percent above 1953. This increase was considered significant and was accomplished in spite of there having been no homogenized fish production in 1954, compared with 5 million pounds in 1953. Herring-meal production increased slightly but the increase was primarily in ocean perch and white-fish meals.

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NOMENCLATURE FOR NYLON FISH-NET TWINE PROPOSED: Nomenclature for identifying nylon fish-net twine was recommended for universal use by the Canadian fishing trade at the first meeting of the Committee on Specifications for Fishing Gear (Canadian Government Specifications Board) held at Ottawa on November 29, 1954. Representatives of gear suppliers, fishermen, fish processors, and the Canadian Government attended the meeting, reports the December 1954 Progress Reports of the Pacific Coast Stations of the Fisheries Research Board of Canada.

This nomenclature consists of two numbers separated by a hyphen. The first number is the denier (weight per unit length) of the yarn used to make the twine. It has become necessary to state the yarn denier because yarns of 140, 210, and 250 denier are in common use. The second number indicates the twine construction and follows the system already widely used in Canada. If the second number consists of a single digit, it is the number of threads in the twine. For example, 140-3 nylon twine for lake fishery gill nets is constructed by twisting together 3 threads of 140 denier each. If the second number consists of more than one digit the twine is of cable or hawser construction. The last digit is the number of plies in the twine and the preceding digit or digits is the number of threads per ply. For example, 210-53 nylon twine for sockeye salmon gill nets is a 3-ply twine which has 5 threads of 210 denier each in each of the 3 plies. Similarly, 250-123 nylon twine for spring salmon gill nets is a 3-ply twine which has 12 threads of 250 denier each in each of the 3 plies.



## Denmark

**FISHERIES PRODUCTION AND EXPORTS, 1954:** The Danish fisheries in 1954 yielded 353,000 metric tons of fish (including pond trout), valued at about 225 million kroner (US\$32.6 million) ex-vessel, according to preliminary reports in Danish trade papers (Dansk Fiskeritidende of January 14, 1955, and Fiskeribladet of January 14). This represents about a 7-percent increase over 1953.

In 1954, 39 new vessels were added to the fleet, which is valued at 167 million kroner (US\$24 million). Installation of echo sounders in the fleet increased from 525 to about 900.

Despite the fact that prices dropped for the more important supplies and gear which fishermen buy, except ice, the return on their investment was only nominal.

The Danish processing industry in 1954 used about 57,000 tons of fish, an 18-percent increase over 1953. This was due largely to the 25-percent increase in filleting, mainly of flatfish and cod. The catch of bluefin tuna totaled 900 tons and brought an average ex-vessel price of 2.15 kroner per kilo (14 U. S. cents per pound). The fish-meal and oil industry utilized about 107,000 metric tons of herring. Fish-meal and fish-oil production, including that from offal, increased 32 percent to 37,000 metric tons of fish meal, and 10 percent to over 24 million pounds of oil.

Danish exports of fishery products, including fish meal and fish oil, in 1954 increased about 11 percent to 235 million kroner (US\$34 million) and amounted to about 135,000 metric tons. Exports to the United States increased about 50 percent as compared with 1953, being made up of substantial quantities of fish meal and pond trout. Danish exports of fish meal doubled in 1954 with the United States taking one-third of the total.

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**FREEZING LIVE FISH:** Experiments in suspending animation by freezing fish for long periods and then reviving them, have been carried on in Denmark recently by a young scientist and possibly have potentialities for commerce, although at the present time it is more a scientific curiosity than anything else, reports the February 4 issue of The Fishing News, a British fishery magazine.

The young scientist is an Assistant of Fisheries in Copenhagen. In his initial experiments he injected a fluid anesthetic mixture of evipan and urethan. After this the fish were shock-frozen at 50° C. (-58° F.) into blocks of ice where they were kept for periods of from 6 to 29 days. On being thawed, 38 percent of the fish were alive.

Another experiment was carried out later. On this occasion six live plaice were frozen but only to -25° C. (-13° F.). After 48 days the plaice were thawed in sea water and 5 out of the 6 were alive.

Altogether the scientist has made 50 experiments with good results and is still proceeding with further experiments.

In Germany a scientist has experimented on somewhat similar lines except that instead of using injections he has used an electro-narcotic method to deaden the fish. The outcome of these experiments has not yet been revealed. In 1951 a Canadian scientist kept anesthetized fish alive for 24 hours in broken ice in wood boxes.



## Ecuador

**FISHERY CONCESSIONS GRANTED TWO U. S. OWNED FIRMS:** Concessions have recently been awarded by the Ecuadoran Government to two fishing companies owned by United States interests but organized under Ecuadoran law, states a January 15, 1955, U. S. Embassy dispatch from Quito. The January 6 Registro Oficial contains the decree authorizing Pesca Ecuatoriana Santaelenense C.A. to fish in Ecuadoran waters without restriction as to species, and to process and export such fish. On January 14 there was published in a Quito newspaper a decree authorizing Products del Pacifico Ecuatoriano S. A. to fish for shrimp in Ecuadoran waters and to process and export the shrimp. This decree is expected to be published in the Registro Oficial at an early date.

The concessions granted the two companies are identical in many respects. Each is to run for 10 years. Each company is exempted from export taxes. Domestic sales are to be made at controlled prices so fixed by the Government as not to allow the companies more than a 15-percent profit margin. Vessels owned by the companies must be registered under the Ecuadoran flag within a year after the signing of the concession agreements. At least 25 percent of the personnel employed in each part of their operations (fishing, refrigeration, and processing) must be of Ecuadoran nationality. Exemption is granted from all duties on the machinery, equipment, and capital permitted to be imported for establishing and carrying on the business.

There are several differences, however, between the two concessions. For example, Pacifico is permitted 20 fishing vessels and four launches, whereas PESCA is allowed a mothership refrigeration boat and 15 fishing vessels. PESCA is required to set up a cold-storage warehouse, a freezing plant, and a cannery, each within a specified period of time. Pacifico is presently renting a cold-storage warehouse, and there are no requirements for a freezing plant or cannery in its case. However, the extent of Pacifico's operations is perhaps expected to be larger, in spite of the fact that its concession is confined to shrimp. It is obligated to invest at least 500,000 sures (US\$33,000) a year excluding wages and supplies, whereas the figure for PESCA is 150,000 sures (US\$9,900). Pacifico must deposit 300,000 sures (US\$19,800) with the Government as a guaranty for the fulfillment of its contract, as against 150,000 sures (US\$9,900) for PESCA.



## German Federal Republic

**FISHERIES RESEARCH VESSEL LAUNCHED:** The first oceanic research vessel built for the German Federal Republic since World War II, the motor trawler



The Anton Dohrn, a new German fishery research vessel. The leading new feature is a shelter deck above the main deck. With the trawl worked on the starboard side, the cod end is lifted above the shelter deck and emptied through the circular hatches which lead to the main deck. The fish is then processed on the main deck.



Port side of the Anton Dohrn where accommodations for the crew, scientists, and students are located.

Anton Dohrn, was launched in Cuxhaven and is carrying out trial trips, according to Dansk Fiskeritidende (February 11), a Danish fishery periodical. The vessel was scheduled to be delivered to the Ministry of Agriculture's Department of Fisheries in Bonn in early March 1955.

The vessel's first trip will include research involving young fish in the southerly North Sea and will be made in cooperation with the German hydrographic research vessel Gauss and the research cutter Uthorn from the Helgoland biological station.

After the first trip, which will require three weeks, the Anton Dohrn will go to the fishing banks around Iceland and East Greenland in May and June 1955. There the Institute for Net and Equipment Research in Hamburg expects to conduct experiments with a midwater trawl in the catching of school fish, such as the deep-water ocean perch and cod and pollock. Plankton and hydrographic research also will be carried out.



### Iceland

**FROZEN FILLET INDUSTRY TRENDS, JANUARY-NOVEMBER 1954:** A total of 173,435 metric tons of fish or 47 percent of the total Icelandic catch was delivered to freezers in the first 11 months of 1954 as compared with 92,413 tons or 27 percent of the total catch during the similar period in 1953. The proportions of ground-fish processed by various plants in 1954 probably was about equal to 1953 when 71 percent was processed by plants members of the Freezing Plants Corporation, 24 percent by plants of the Federation of Cooperative Societies, and 5 percent by the State Fish Packing Center.

Icelandic fish producers were planning to process fish sticks in Iceland for export to the United States until they heard of the proposal to increase the import duty on breaded and cooked fish sticks. Prospects for exports of frozen fish fillets to the United States look less favorable in 1955 than in 1954 because of increasing production costs in Iceland and because freezing plants in Denmark, Germany, Canada (Nova Scotia), and other countries have begun production of frozen fillet blocks and are underselling Icelandic producers.

The two principal species processed into quick-frozen fish fillets are cod and ocean perch. Line fishing for cod off south and southwest Iceland was particularly successful in 1954, apparently indicating that fish conservation resulting from the extension of the fishery limits has been successful. During World War II and the immediate postwar years the fish catch increased due to the small number of trawlers engaged in fishing. From 1948 to 1952 the catch declined by 30 percent. In the Faxa Bay area (southwest Iceland) the 1953 catch by long line increased by 14 percent per fishing trip over 1952. The increase continued in 1954 with an increase of 33 percent over 1953. Research in the Faxa Bay confirmed these findings. Outside of Faxa Bay the fishing results have been irregular; although there has been improvement in some areas no distinct tendency has been noted. Because of the relatively profitable operation of the motorboat fleet in 1954, the Government made an investigation concerning the possibility of reducing the subsidy on motorboat operations.

Trawler cod catches have been relatively poorer than catches by motorboats. Trawlers have not been able to retain skilled crews because wages on trawlers relative to other occupations have been low, and because trawlers no longer land fresh fish on ice in Great Britain.

The principal reasons for the large (75 percent) increase in the catch of ocean perch are the ready sale for quick-frozen ocean perch fillets to the U.S.S.R. and the new ocean perch fishing grounds discovered off Greenland which are considerably closer to Iceland than those frequented previously by Icelandic trawlers.

Most of the fish-freezing plants are in southwest Iceland, and north Iceland has depended on the herring and salted and dried groundfish industries. The failure of the recent herring seasons has caused pressure for the construction of additional freezing plants in north Iceland. The Fisheries Company of Akureyri in particular has been attempting to obtain the necessary guarantees to obtain a foreign loan for the construction of a freezing plant. Other areas are also attempting to improve their fishing fleet and fish-processing facilities to counteract the attraction of the employment opportunities in southwest Iceland.

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LOBSTER FISHERY BEING DEVELOPED: A new lobster fishery industry is developing in the vicinity of Eyrarbakki in southwestern Iceland, states an October 15, 1954, U. S. Legation dispatch from Reykjavik. The production is still largely experimental because only little is known about the location or how heavily lobster grounds can be fished without depletion.

Previously most lobsters were caught with a trawl inside Iceland's fisheries limits which required a special permit from the Icelandic Government. More recently lobsters have been discovered outside the territorial waters where there are no fishing limits. Most lobsters are caught in 70-90 fathoms of water about two hours' trip from the harbor. The fishing boats employ 13 men, and 40-50 people are employed in the freezing plants.

Most of the lobsters are shelled and frozen, although Iceland is experimenting with exporting frozen lobster in the shell to the United States.

The lobster waste is processed in a fish-meal factory. The meal is approximately 15 percent protein and 30 percent calcium which it is believed will make a good feed concentrate.



### Japan

FIRM TO CONVERT THREE VESSELS TO SALMON AND CRAB FACTORYSHIPS: One of the three largest Japanese fishing organizations is considering the purchase of three Japanese cargo vessels for conversion to cannery ships. Two of the ships would become motherships for salmon expeditions and one for a crab fleet. The ships named as under consideration are the Eiko Maru of 5,289 gross tons, the Kizan Maru of 7,933 gross tons, and the Kaiyo Maru of 4,963 gross tons, the latter being the proposed crab cannery. Inquiries have also been made of local shipyards for temporary conversion of two other general cargo vessels into salmon cannery vessels on a limited scale, the purpose being to charter the ships for the season only, returning them to their owners upon its conclusion.

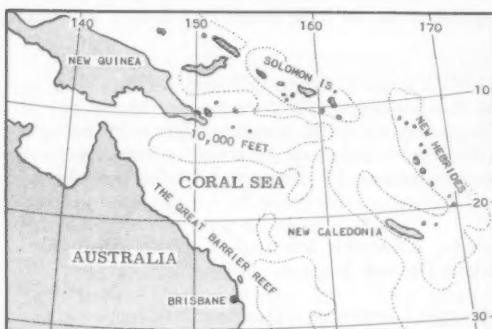
None of these proposals are beyond the tentative stage as yet but they are reported as evidence of belief that the salmon and crab catchers will show improved results, possibly because of easing of the U. S. S. R. attitude regarding Japanese fishermen in Okhotsk and Kamchatkan waters, a January 21, 1955, U. S. Embassy dispatch from Tokyo points out.

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CANNED CRAB MEAT EXPORTS, 1954: Japanese canned crab meat exports in 1954 totaled 332,800 cases against 204,000 cases in 1953. Exports to the United States amounted to 126,200 cases, considerably lower than the 195,000 cases exported in 1953. Countries other than the United States in 1954 imported 206,000 cases of Japanese canned crab meat (or 62 percent of total exports) against 9,000 cases the previous year (or 5 percent of total exports). The United Kingdom took 45 $\frac{1}{2}$  percent of all Japanese canned crab meat exports in 1954 as compared with a negligible amount in 1953.

The increase in the Japanese crab catch and canned crab meat exports came almost entirely from the waters off Japan and the U. S. S. R., since the 1954 catch of king crab in Alaskan waters was only 2,000 cases in excess of that in 1953. With the two crab expeditions proposed for the Sea of Okhotsk in 1955, local fishing circles are estimating an export of 400,000 cases for the year, reports a February 24 U. S. Embassy dispatch from Tokyo.

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TUNA VESSEL MAKES GOOD CATCH IN CORAL SEA: The captain of the Japanese tuna vessel Kasima Maru reports he found the Coral Sea teeming with tuna and caught 5 metric tons in a few days 600 miles ENE. of Brisbane, Australia. He expressed surprise that an Australian official tuna survey in the Coral Sea had recently shown poor results, according to the December 1954 Pacific Islands Monthly, a South Seas magazine. The Kasima Maru had put in to Brisbane for engine repairs.

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MARINE PRODUCTS EXPORTS FOR 1954 AND OUTLOOK FOR 1955: The Japanese fisheries generally experienced a prosperous year in 1954, according to a January 10, 1955, U. S. Embassy dispatch from Tokyo. In foreign trade a ready market was met for most products--squid and cuttlefish for Asiatic countries, salmon for sterling areas, and crab meat for the United States all recorded increased volume of shipments. Over-all exports of marine products for the year, based on 11-months' data, were expected to amount to 140,000 metric tons, valued at US\$74.8 million, compared with 1953 shipments of 121,000 tons, declared as worth US\$60.7 million dollars.

A substantial portion of this export business was with the United States and consisted largely of canned and frozen tuna. However, fish-liver oil, whale oil, and pearls also figured importantly in Japan's exports of marine products. Demand was firm in the early months of the year but later softened and the export price of frozen white-meat tuna declined from about US\$425 per ton to about US\$325 per ton or lower at the end of the year. Despite a flurry of business in December, moderate stocks of both frozen and canned tuna were being held in Japan as the year closed, pending improvement in market demand.

For 1955 there seems to be no reason why the business in marine products should not be at least as favorable as for 1954. Continued additions of new and larger fishing boats are being made to present fleets, permitting longer voyages and better fishing techniques. Results of this in 1954 were evidenced by improved catches throughout the industry except where a particular species (herring) failed

to appear in its normal quantities and habitats. Three whaling fleets are in the Antarctic for the 1955 season against two fleets previously. The export of whale oil should therefore be increased by about 50 percent. The salmon fleets should do at least as well as the 1954 expeditions, which caught  $2\frac{1}{2}$  times as many fish as the 1953 fleets. The demand for tuna in the United States will presumably be stabilized by early 1955. Should there be any appreciable lowering of the import tariffs of the United States and of the sterling countries for aquatic products, the effect would be promptly felt in Japan's fisheries.



### Mexico

U. S.-MEXICAN FIRM MAY EXPLOIT GULF TUNA: A tuna canning plant set up with joint United States-Mexican capital may be established in Tampico or Matamoros, Mexico, to exploit new tuna resources recently located in the Gulf of Mexico, states a February 10 U. S. Embassy dispatch from Mexico City.

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MERIDA FROZEN FISH AND SHRIMP EXPORTS, 1954: Frozen Shrimp: Exports of frozen shrimp from the Merida District of Mexico during 1954 totaled 11.1 million pounds (not including Campeche exports during Oct.-Dec.), reports a February 9 U. S. consular dispatch from Merida. This is a sizable increase as compared with 1953 exports of 9.7 million pounds.

Frozen Fish: Merida exports of frozen fish during 1954 totaled 284 metric tons, all of which went to the United States.

Prevailing prices for Merida exported frozen fish during the last quarter of 1954 were 18 U. S. cents a pound f. o. b. Progreso for mero (heads off); while fillets of mero and corbina sold for 29 and 31 U. S. cents a pound, c. i. f., New Orleans, La., respectively.

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MERIDA SHARK FIN EXPORTS, 1954: Exports of shark fins from the Merida District of Mexico during 1954 totaled 11,224 pounds, compared with 9,434 pounds in 1953. Stormy weather during the latter part of the year curtailed fishing operations and drastically reduced exports during that period. Most of these exports are shipped to the United States.



### Norway

SARDINE CANNERS INCREASE ADVERTISING IN UNITED STATES: The Norwegian Canners Association has expanded its advertising and sales promotion campaign for Norwegian sardines to cover 14 major United States marketing areas, the Norwegian Information Service reported on February 17.

The Association, encouraged by increased sales of sardines as a result of a three-year advertising and promotional campaign in 6 major United States marketing areas, has announced 8 new major targets for its 1955 campaign, according to the New York Journal of Commerce of February 4.

Backed by newspaper advertisements, 42 weeks of radio-television spots, and an over-all publicity campaign in all media, Norwegian sardines will be promoted in these new markets: Baltimore, Washington (D. C.), Philadelphia, Cleveland, Detroit, Milwaukee, Portland (Ore.), and Seattle, in addition to New York, Boston, Chicago, Minneapolis, San Francisco, and Los Angeles.

The article points out that "This year's intensive campaign is keyed to the slogan 'The Best Sardines Come Your Way from Norway.'"

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1955 WINTER HERRING CATCH LESS THAN LAST YEAR: The Norwegian 1955 winter herring season officially ended on February 13 and produced a total catch provisionally set at 713,227 metric tons, with an ex-vessel value of Kr. 137 million (US\$19 million), second only to the 1954 catch. The final figure for the 1954 catch was 872,426 metric tons, valued at over Kr. 177 million (US\$25 million), reports the Norwegian Information Service in a February 24 bulletin.

The mature herring, wending their way across the North Atlantic from waters east of Iceland, begin to arrive around the middle of January. At this stage, the large fish contain up to 12 percent fat. These fisheries last until February 12-15, depending on the fat content. After the herring has finished its spawning mission, the fat content drops to about 8 percent. Then follow the spring herring fisheries, which are officially called off about March 20. In 1954 the fishermen landed nearly 1.1 million metric tons of fat herring, with an ex-vessel value of more than Kr. 200 million (US\$28 million) the largest herring catch made in Norway.

The path followed by the herring on their never-ceasing migration has been traced by scientists of the Norwegian Ocean Research Institute. Their observations indicate that as the herring head toward the Norwegian coast they go into a cold-water pocket formed by currents from the Arctic Sea. This pocket is usually found west of the Sunnmore coast. But, if the North Atlantic is warm, the cold-water pocket may be pushed farther north, which explains why the herring some years make their first appearance at points north of the Sunnmore district. At high tide the cold-water pocket is pressed farther down than the herring can stand. Breaking through the cold-water barrier, they swim toward the coastal spawning banks at a speed of some 30 nautical miles.

A basic drawback of the Norwegian herring fisheries has always been their seasonal nature. However, judging from experiments made by scientists aboard the ocean research vessel G. O. Sars, pelagic herring fisheries in the Norwegian Sea, with superefficient purse seines, appear to be a distinct possibility. But it would require larger fishing vessels, all equipped with sonar, and the assistance of ocean researchers to pinpoint the whereabouts of the largest shoals. According to a fisheries consultant, summer weather conditions are on the whole more favorable in the Norwegian Sea than along the coast.

More than 80 percent of the total catch now goes to the 74 herring-meal and herring-oil factories strung along the coast as against only 51.8 percent up to 1949. Varying with the size of the landings, the annual output of the reduction plants has increased notably in recent years. Prior to 1954, for which figures are not available as yet, the highest production was reached in 1951, with 180,055 metric tons of herring meal and 81,728 tons of herring oil. Most of the reduction plants, 47 to be exact, are located along the west coast, while 6 are in the central Trondelag provinces, and 18 in the 3 northern provinces.

In addition to these shore plants, Norway has three floating herring factories equipped with modern reduction machinery and loading facilities, which follow the

fishing fleet wherever it goes. These are the 11,000-ton Ronald and the 7,000-ton Clupea, and new in the 1955 season is the S. S. Haeringur which has a daily processing capacity of 800-1,000 tons of raw herring.

A growing number of Norway's reduction plants has in the past few years installed special machinery for the production of vitamin-rich whole fish meal. The process involves reclaiming the so-called stickwater and reincorporating it with the herring meal in the form of condensed fish solubles. By utilizing the stickwater, which formerly was wasted, the reduction plants can increase their output about 20 percent.

Improved methods of utilizing the stickwater are being developed at the Kr. 5 million (US\$700,000) Research Institute of the Norwegian Herring Oil and Meal Industry. Located at Tjaereviken, near Bergen, this privately-financed institute is a combination laboratory-pilot plant, affording the opportunity to test, on a semi-industrial scale, the findings and processes developed by researchers.

As part of its studies of the nutritional value of fish meal, the Institute operates an experimental animal farm, stocked with some 2,000 chickens and 25 hogs. Several years ago the Tjaereviken scientists ascertained that herring meal contains optimal proportions of the yet to be isolated animal protein factor (APF), which makes for healthy animal growth, and also an ideal distribution of amino acids. A major accomplishment of the Institute is the development of a preservative fluid which, when sprayed on the herring as it is being loaded, has proved extremely effective in preventing costly spoilage.



### Peru

1954/55 TUNA SEASON DELAYED BY LOW PRICES: The Peruvian 1954/55 tuna season started late and as canned tuna prices in the United States were low, Peruvian canners offered the fishermen only 15.50 soles (about 82 U. S. cents) per dozen tuna at the outset of the season. Although fishermen refused to make deliveries for about 19 days, they were finally obliged to accept this price.

Peruvian exports of fishery products in 1954 may reach nearly US\$10 million, reports a January 29 U. S. Embassy dispatch from Lima.

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HIGHER OCEAN FREIGHT RATES FOR CANNED FISH AND FISH MEAL SHIPPED FROM PERU TO U. S. PORTS: The West Coast South America Northbound Conference has decided to increase the ocean freight rates on canned fish from \$27 to \$35 per ton effective March 1 on shipments from Peru to the United States, reports a February 23 U. S. Embassy dispatch from Lima. The Conference also proposed to increase fish meal ocean freight rates from \$22 to \$25 per ton, but deferred the effective date until June 20 because of the current low price for this product on United States markets.



### Portugal

FISHING TRENDS, OCTOBER 1954: Sardine Fishing: Sardine landings during January-October 1954 totaled 69,838 tons, valued at 188.5 million escudos (US\$6.5 million) as compared to 59,083 tons, valued at 153.4 million escudos (US\$5.3 million), for the same period in 1953.

Just like the previous months, the fishing of sardines in Portugal during October 1954 took place among really favorable conditions, going far beyond the month-



Trawl catch on deck of Portuguese trawler off northern coast of Africa.



Hauling net aboard on a Portuguese trawler off the west coast of Africa.

ly rate reached to date. In October 1954 sardine landings in the eight main fishing centers of Portugal amounted to 21,965 metric tons, valued at 54.6 million escudos (US\$1.9 million ex-vessel). During October 1953 the sardine landings amounted to only 15,994 tons, valued at 35.2 million escudos (US\$1.2 million).

The leading sardine fishing centers are Matosinhos, Setubal, and Portimao.

Other Fishing: Landings of tuna and tunalike fish, mackerel, anchovy, and chinchard amounted to 4,343 tons in October 1954, valued at 4.4 million escudos (US\$0.2 million). For the first 10 months of 1954, landings for these species amounted to 40,052 tons, valued at 67.5 million escudos (US\$2.3 million).

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**CANNED FISH TRENDS, JANUARY-OCTOBER 1954: Exports:**  
Portuguese canned fish exports totaled 38,060 tons, valued at 593.6 million escudos (US\$20.5 million), during January-October 1954 (table 1).

The increase in Portugal's exports of canned fish was accompanied by considerable changes in the structure of its markets during 1954, according to *Conservas de Peixe* (January 1955). During January-October 1954 Germany was the leading receiver with 108.4 million escudos or US\$3.7 million of canned fish (principally sardines), followed by Great

Table 1 - Portuguese Canned Fish Exports, January-October 1954

Product	Jan.-Oct. 1954	
	1,000 US\$	Metric Tons
Sardines in oil or sauce . . . . .	29,846	14,997
Sardinelike fish in oil or sauce . . . . .	3,299	2,345
Sardines & sardinelike fish in brine . . . . .	679	151
Tuna & tunalike fish in oil . . . . .	2,506	1,859
Tuna & tunalike fish in brine . . . . .	544	330
Mackerel in oil . . . . .	735	466
Other fish . . . . .	451	329
Total . . . . .	38,060	20,477

Britain with 97.8 million escudos or US\$3.4 million (principally sardines), Italy with 88.8 million escudos or US\$3.1 million, and the United States with 77.3 million escudos or US\$2.7 million (principally 1,774 tons of sardines in oil or sauce, 13 tons of tuna and tuna-like fish in oil, and 1,703 tons of anchovies).

Table 2 - Portuguese Canned Fish Pack, Jan.-Sept. 1954

Product	Quantity
	Metric Tons
Sardines in oil or sauce . . . . .	14,544
" " brine . . . . .	630
Sardinelike fish in oil or sauce . . . . .	3,636
" " " " brine . . . . .	656
Tuna in oil or sauce . . . . .	777
" " brine . . . . .	78
Tunalike fish in oil or sauce . . . . .	408
Crustaceans in oil or sauce . . . . .	9
Mollusks in oil or sauce . . . . .	191
" " brine . . . . .	3
Other in oil or sauce . . . . .	286
Other in brine . . . . .	64
Total . . . . .	21,282

Pack: The Portuguese pack of canned fish January-September 1954 amounted to 21,282 metric tons, 6,986 tons greater than in the same period of 1953 when only 14,296 tons were packed (table 2).

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#### AZORES TUNA EX-

PORTS TO THE U. S., 1954: Total Azores canned tuna exports to the United States in 1954 amounted to 1,272,257 pounds, valued at US\$302,388, reports a January 11 U. S. consular dispatch from Ponta Delgada. This was an increase of 31 percent in volume and 35 percent in value as compared with 1953 canned tuna exports to the United States of 972,017 pounds, valued at US\$223,398. Also in 1953 the Azores exported to the United States 660,000 pounds of frozen tuna, valued at US\$92,000, but none was exported in 1954.



#### Federation of Rhodesia

CANNED FISH IMPORTS NOT UNDER CURRENCY RESTRICTION: Canned fish and plain fish hooks (excluding artificial lures, flies, spoons, etc.) are again included in a list of products which may be imported from dollar and nonsterling sources for the first half of 1955 into the Federation of Rhodesia without currency restrictions. They will still require import licenses, but these will be issued subject to scrutiny only, according to the January 22, 1955, Foreign Trade, a Canadian Government publication.



#### Spain

VIGO FISH CANNING TRENDS: January 1955: The United States market which for many years has been the principal consumer of the best quality of the Spanish canned fish has lately shown increased interest in the possibility of importing albacore tuna from Spain. Spanish fish canners, aware of the capacity of the United States market, foresee increased activities if, in the absence of sardines from local waters, they are able to pack albacore in sufficient quantities. For this reason the Fish Canners Association is actively engaged in negotiations with the Association of Owners of Fishing Vessels to extend the albacore tuna fishing season, operating from about the early part of March until the end of September. The normal season has been from about the middle of May to the end of September. For this purpose some of the larger vessels, now devoted to hake and other deep-sea fishing, would

have to transfer to albacore fishing, an operation which is not as easy as it would appear, since it involves the changing of practically all fishing equipment as well as the installation of tanks to carry live bait for albacore tuna fishing.

While many vessel operators agree that a prolonged albacore tuna fishing season might be beneficial, they hesitate to make the shift because of financial outlays involved and their hope that sardines will sooner or later reappear along the littoral.

Fish canneries in the Vigo area purchased during January 1955, 292,116 pounds of fish or about 3.5 percent of the total catch entered through the Vigo Fish Exchange. This compared to 279,754 pounds or about 3.7 percent in January 1954. Activities in packing plants were limited to the canning of anchovies and small quantities of "castaneta" for the domestic market, reports a February 11, U. S. consular dispatch from Vigo.

December 1954: Activities of the long-range deep-sea fishing fleet were restricted by rough weather and the few vessels which traveled to the fishing grounds operated under unfavorable conditions aggravated by the scarcity of fish which forced them to remain out longer. The smaller vessels operating in nearby waters engaged in the seasonal fishing of jurel (Tracharus tracharus). This species has been abundant and catches account for more than 50 percent of the total fish catch entered in the port but its market value was so low that operators claim that vessels worked at a loss.

Arrests of fishing vessels along the Portuguese coast by the Portuguese Coast Guard continued during the month. The industry, through fishing syndicates, is renewing its appeal to the central government to attempt to correct this situation.

Fish canneries in the Vigo area purchased 3,179,222 pounds of fish during December 1954 or about 18 percent of the total catch entered through the Vigo Fish Exchange. This compares to 1,276,594 pounds or about 15 percent in December 1953.

The scant amount of sardines available during the month were absorbed by the industry at the almost prohibitive price of from pesetas 4.25-5.00 per kilo (8.8-10.4 U. S. cents per pound). The seasonal price is pesetas 1.50 per kilo (3.1 U. S. cents per pound). Other specimens prepared during the month were castaneta (bramariel), alrique (needlefish), and jurel (Tracharus tracharus), mostly for consumption in the domestic markets.

In spite of present difficulties, the industry is optimistic and hopes that as a result of bilateral trade agreements reportedly being negotiated it will be able to reenter some of its former markets, especially West Germany.

Stocks of oil, tin plate, and other raw materials, while seasonally below normal were reported to be adequate for present output, a January 14, U. S. consular dispatch from Vigo points out.

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FISH CANNERS OF SANTANDER EXPORT LESS IN 1954: Fish canners in the Province of Santander, Spain, did not export as much canned fish in 1954 as in 1953. Of 30.0 million pounds of fish canned in 1954, the canners exported only 10.8 million pounds (36 percent), but in 1953 out of a pack of 21.9 million pounds, 15.7 million pounds (72 percent) were exported.

The total catch of fish in Santander during 1954 amounted to 46.3 million pounds, valued at 88.3 million pesetas (US\$4.0 million), reports a February 18 U. S. consular dispatch from Bilbao. The 1953 catch totaled 45.4 million pounds, valued at 63.2 million pesetas (US\$2.9 million).

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**SARDINE VESSELS DETAINED BY PORTUGAL IN TERRITORIAL WATERS DISPUTE:** The absence of a clear understanding between Spain and Portugal in regard to territorial waters continued to result in difficulties, according to Spanish fishing interests. Portuguese authorities have detained vessels and confiscated catches of Spanish vessels operating out of Galician ports.

The Vigo sardine fishing fleet travels as far south as Cape St. Vincent in the search for sardines. Vessel owners claim that their boats operate in that area but outside the six-mile limit fixed by the Portuguese and that their operations are under constant surveillance by Portuguese fiscal services. On the way back to the home port, these vessels, none of which is larger than 150 tons, travel as close as possible to the coast because of the rough seas prevailing in the winter. If on their return trip they are stopped by a Portuguese Coast Guard ship, the vessel is inevitably taken to a Portuguese port where the catch is confiscated and sold at public auction, the ship detained for 3 to 7 days, and the owner subsequently fined on the assumption that the catch was taken within territorial waters. While this is a long-standing problem and has resulted in serious incidents in previous years, like the sinking by gunfire of one or two vessels which refused to comply with the orders of the Portuguese Coast Guard, the situation is again becoming difficult.

During November 1954, 12 fishing vessels operating out of Vigo and Marin were detained, some of which were still waiting in Portuguese ports for the decision of Portuguese courts, according to a December 13, 1954, U. S. consular dispatch from Vigo.



### United Kingdom

**NAVY TO PROTECT BRITISH WHALING FLEETS:** As a precaution against interference with British whaling fleets operating in the Antarctic in the current season, the British Admiralty has assigned the cruiser Superb (9,000 tons) and the 1,300-ton frigate Burghead Bay to that area.

A courtesy visit will be paid to the Chilean capital, reports the January 21, 1955, issue of The Fishing News, a British fishery periodical.

The Superb and the Burghead Bay, which are stationed at Bermuda, will go from Callao to the Falkland Islands, where the frigate Veryan Bay arrived recently.

South Africa also has a whaling fleet operating in those waters and the naval protection in the event of any attempted interference.

chairman of a Union whaling company has announced that they would seek British



The position arises out of the Onassis incident and the claim of Chile, Ecuador, and Peru that they possess exclusive rights over the ocean 200 miles from their shores. There are a few islands in the Antarctic belonging to Chile who claims that the same position applies to them, namely that the waters for 200 miles around them are "all hers."

Argentine, too, claims territorial rights over the Falklands, which has been British territory for several hundred years.

Lloyd's has warned that the war risk clause in the whaling fleets' policies are involved, hence the protection which is being extended.

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COOKBOOK TO AID SCHOOL-LUNCH PROGRAM: The White Fish Authority's campaign to popularize fish meals among school children should gain much through the new booklet "How to Make the Most of Fish," addressed to the school meals service by the WFA, reports The Fishing News (January 14, 1955), a British fishery magazine.

Copiously illustrated in color, it catches the eye with appetizing fish dishes, with recipes for school cooks--and, of course, any others who wish to try them. The recipes include several unfamiliar to the average cook, such as "Fish T imbale," "Cod with Grapes," and "Russian Fish Pie."

The recipes include many varieties of vegetables beside the potato. As one of the authorities said, "Fish always calls on its friends of the vegetable and animal kingdom to attend on it, and minister to its final glory. There is no necessity to claim that the humble potato is its only servant."

Giving a series of recipes in a section on "Frying to Perfection," a well-known catering instructor says: "On the whole children prefer their fish fried. Only if that fish is fried to a crisp and golden brown do children enjoy it...fried fish is an ideal food for children, for the 'over fives' at least."

In the introduction the booklet maintains that the view that children do not like fish is not supported by the facts. "The WFA recently made a survey among families with young children and found that 83 percent of the mothers served fish regularly to all members of their families, including the children. And in the schools it has been disproved whenever and wherever an enterprising and imaginative attempt has been made to combat it. Many education authorities have tackled the problem successfully."

The booklet describes how one school-lunch officer "deliberately set out to get the children in his schools to eat and enjoy fish. He examined the quality of the fish bought and insisted that it was served attractively and with variety. His success was far beyond anything he had hoped for; fish is now among the most popular meals served."

Other sections of the booklet deal with "sauces and garnishing," "Fish Dinners on the Move--how to transport fish meals with the least possible loss of flavor and attractiveness," "Do's and Don'ts," also five "favorite" questions on fish cookery in schools--with their answers; and a word of advice to school cooks--"Keep in close touch with your fishmonger or supplier, and know when to buy. For example, soles are sometimes cheaper than haddock."



### Union of South Africa

**FISHERIES TRENDS, DECEMBER-JANUARY:** There was no fishing for pilchards and jack mackerel in South Africa during December 1954, and inventories of canned fish were reduced. The new season began in January 1955, and sales of fish oil and fish meal were made on a forward basis at high prices. The trend of prices for canned fish, however, was downward. Spiny lobster canners and processors were quite busy, and in many cases were working on back orders, states a February 14 U. S. consular dispatch from Cape Town.



### U. S. S. R.

**LARGE HERRING FLEETS IN NORTH ATLANTIC:** Russia's 1954 herring expeditions in the North Atlantic operated a fleet of 23 motherships and 270 fishing boats (in all over 300 craft), according to Fiskets Gang (January 27, 1955), a Norwegian fishery periodical. This information was included in a brief description of a Moscow meeting of representatives of the various Soviet herring expeditions carried in the December 25, 1954, issue of Izvestija, a Russian publication. The vessels had the latest type of equipment and with the aid of new techniques and previous experience had expected to increase the 1954 catch substantially. Up to December 25, 1954, the catch totaled 155,100 metric tons as compared with 110,000 tons on the same date a year earlier. The goal for 1954 had been set at 170,000 tons.



### Venezuela

**JAPANESE TO AID STUDY OF VENEZUELAN TUNA FISHERY:** A representative of the Venezuelan Association of Fish Canners and representatives of a consortium of Japanese tuna canners were to begin studies of the tuna fisheries off Venezuela with the possibility that Venezuelan fish canners may establish a tuna industry. A report on Venezuelan fishes in Caribbean fisheries issued June 8, 1944, pointed out that there are tuna present in Venezuelan waters but these fish are not now exploited, states a February 9 U. S. Embassy dispatch from Caracas.

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**FISH CANNERS SEEK FOREIGN MARKETS:** Venezuelan fish canners were sending samples of their products to Africa, Germany, and Trinidad, with the expectation of developing sales in those places, the President of the Venezuelan Fish Canners' Association informed the press on January 31, 1955. He said the stocks of unsold canned fish in Venezuela continue to increase but he is optimistic the problem will be solved with the help of the Foreign Office, reports a January 31 U. S. Embassy dispatch from Caracas.

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**FISH CANNERS SEEK GOVERNMENT HELP:** Venezuelan fish canners are still trying to get the Venezuelan Government to help them with their overproduction problems, states a January 24 U. S. Embassy dispatch from Caracas. They have presented the following plans for Government action:

- (1) That the Government finance fish canning in 1955 and buy all the canned fish the canners cannot sell to the public. This Government stock to be used in official institutions.

(2) Should the Government decline then the canners and the Government should arrange a combination whereby fish is canned under only one brand, quality is standardized, distribution is by one organization, and production quotas are established for each canner.

The canners believe by this means they can reduce advertising and administrative costs to such a degree that the cost of Venezuelan canned fish will be low enough to enable them to compete on the world market without subsidy. Of course, if the Government complies and discovers that the actual savings are not sufficient to permit the canners to sell their product abroad, it will have some responsibility to see that the canned fish find a market. At the present time and despite all previous efforts the responsibility for marketing canned fish is entirely that of the canners.



#### SPARE COPIES OF 1939 "FISHERY MARKET NEWS" AVAILABLE

The Service has available for distribution a limited number of spare copies of the 1939 issues (volume 1) of Fishery Market News (the forerunner of Commercial Fisheries Review).

Listed below is one of the articles appearing in each issue, in addition to a review of conditions and trends of the commercial fisheries.

JAN. 1939 -	"FISHERY MARKET NEWS SERVICE AIDS INDUSTRY IN MANY WAYS"
FEB. 1939 -	"SUGGESTIONS FOR STORING FROZEN FISH"
MAR. 1939 -	"CONSIDER THE FISHES"
APR. 1939 -	"WHALING"
MAY 1939 -	"CHICAGO'S FISH"
JUNE 1939 -	"THE CHESAPEAKE BAY SOFT CRAB INDUSTRY"
JULY 1939 -	"BIOLOGICAL INVESTIGATIONS OF THE NORTH ATLANTIC FISHERIES DURING 1938"
AUG. 1939 -	"THE SIGNIFICANCE OF BYPRODUCTS TO THE FISHERY INDUSTRY"
SEPT. 1939 -	"JAPANESE OYSTERS--A MILLION DOLLAR INDUSTRY IN THE PACIFIC COAST STATES"
OCT. 1939 -	"UNUSUAL CANNED SEAFOODS ARE OF MANY VARIETIES"
NOV. 1939 -	"NOVA SCOTIA FISHERMEN AIDED BY COOPERATIVES"
DEC. 1939 -	"RESULTS OF SURVEYS TO DETERMINE THE IMPORTANT SPAWNING GROUNDS FOR STRIPED BASS"

For these spare copies write the Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Washington 25, D. C. Requests will be filled as received until supplies are exhausted. Single copies or a complete set of Nos. 1 through 12 may be requested.



# FEDERAL ACTIONS

## Department of the Interior

### REPRESENTATIVES TO TRADE AGREEMENTS NEGOTIATIONS WITH JAPAN AT GENEVA:

Harry M. Shooshan, International Activities Assistant, Technical Review Staff, was scheduled to proceed to Geneva early in April to represent the Department of the Interior at the tariff negotiations with Japan and other countries convened there. Shooshan, who is the Department's representative on the Interdepartmental Trade Agreements Committee, was a member of the panel at the public hearings held in preparation for this negotiation.

Assistant Secretary Orme Lewis also planned to attend the conference but at a later date.

Negotiations are under way at Geneva at which the respective country delegations bargain for concessions in each other's tariffs. It was anticipated that by early April the concessions would begin to firm up and consummation of reciprocal agreements could be started.

The Department has participated fully in the preparation for these important trade agreement negotiations and has found most helpful the various letters and briefs filed by the fishery industry. Shooshan has been thoroughly briefed on the Departmental position on fishery matters which may be subject to negotiation at Geneva.

The Interdepartmental Committee issued formal notice of its intention to negotiate on November 13, 1954, and supplemented its notice on February 21, 1955, at which time the other members of the United States delegation were announced. The Committee is an inter-agency group designated by the President to advise him in the making of trade agreements. The items to be considered

in the negotiations will be acted upon by the United States delegation in accordance with recommendations approved by the President. Among the items listed for possible consideration in these negotiations were the following fishery products:

Fresh and frozen tuna; fresh and frozen swordfish fillets and chunks; canned tuna; fresh, frozen, and canned crab meat; canned clams and clam products (except razor clams and clam chowder); canned oysters and oyster juice or combinations with other substances; seed oysters; frozen scallops; fresh or frozen frogs and frog legs; agar-agar; kelp; and miscellaneous shellfish and dried fish. Others proposed to be included are certain prepared or preserved fish (including fish sticks containing oil which has been added); herring, pickled or salted; herring, hard dry-smoked; herring, smoked or kippered; and such fishing gear as cotton fish nets and fish hooks; and flax, hemp, or ramie nets or netting.

## FISH AND WILDLIFE SERVICE

### ALASKA COMMERCIAL FISHERIES REGULATIONS AMENDED:

Several significant amendments to the 1955 regulations for the proper utilization and conservation of the commercial fisheries of Alaska were announced April 14 by Secretary of the Interior McKay.

Most important is the one which separates trap sites from areas open to set nets in the Cook Inlet area. In this amendment, the location of every trap in Cook Inlet is pinpointed and the use of any other gear at such sites is prohibited. Exception is made in the northern and north-central districts for the use of king salmon set nets prior to June 25 when traps cannot be used. Traps also are prohibited in areas open to set nets.

The changes in the regulations to describe sites open to traps and areas open to set nets in Cook Inlet were recommended jointly by fishermen, trap operators, and cannery operators, and were unanimously approved by local residents at a series of hearings conducted by the Fish and Wildlife Service at Homer, Kenai, and Anchorage, in January. These changes will prevent the encroachment of either form of gear on the other, and will go far to promote harmony in the salmon fishery of that area. Fishing effort in the area will not be altered by these changes.

With the passage of Public Law 12 (84th Congress) which was approved by the President on March 16, all three types of fishing gear used in Cook Inlet will be left as they were in 1954. The minimum distance between sets in Cook Inlet will remain at 600 feet, the minimum distance between traps at 2,500 feet, and the maximum length of drift nets at 150 fathoms.

A Federal Court decision in Alaska last summer held that set nets are fixed gear. The Fish and Wildlife Service historically has considered them as movable gear. One effect of the court decision was to subject set nets to a statutory requirement which specifies that units of fixed gear must not be less than 1,800 feet apart, laterally. Set nets in the past have been operated from 300 to 600 feet apart.

When the Fish and Wildlife Service reported that an 1,800-foot minimum interval between set nets is not considered essential to conservation requirements, and that imposition of the drastic limitation would impose hardships on small fishermen, the Department ordered action on new set regulations suspended pending action by Congress. Since the new legislation, which the Department supported, was enacted prior to the 1955 fishing season, no immediate change in the set-net regulation is necessary with respect to the distance interval between set nets. Public Law 12, in effect, exempts set, anchored, and staked gill nets from the 1,800-foot minimum distance interval required for all other fixed gear.

One of the amendments will allow beach seines to fish in Chinitna Bay in Cook

Inlet. This was proposed by the Fish and Wildlife Service at the hearings last fall but was not included in the revised regulations announced in January. This is a chum salmon area and this species can be harvested there successfully only by beach seines.

These changes became effective immediately upon publication in the Federal Register of April 19, 1955. Free copies of these Amendments (which amend and supplement the printed regulations issued a few months ago) and further amendments which may be adopted from time to time are available from the Service's Branch of Alaska Fisheries offices at Seattle, Juneau, and Anchorage.

The printed regulations (Laws and Regulations for Protection of the Commercial Fisheries of Alaska, 1955) to which these amendments apply and which were issued a few months ago are available from the Superintendent of Documents, Washington 25, D. C., at 25 cents a copy.



## Department of State

### FISH ITEMS ADDED TO SUPPLEMENTAL LIST FOR CONSIDERATION IN TRADE NEGOTIATIONS WITH JAPAN AND OTHER COUNTRIES:

The Interdepartmental Committee on Trade Agreements issued formal notice on February 21, 1955, which supplemented its notice of November 13, 1954, concerning tariff negotiations involving Japan, to announce a supplemental list of items for consideration in these negotiations. Included in this listing were three portions of tariff paragraphs pertaining to fishery products. (The original list was published in Commercial Fisheries Review, December 1954, p. 78.) The notice also announced the intention of the United States Government to undertake tariff negotiations with Switzerland to compensate that country for the increase in 1954 in the United States duty rates on certain watches and watch movements. It also notified that certain modifications may be made in the Cuban preference in the case

of articles in the list for negotiation with Switzerland.

The need for considering additional items in the negotiations arises primarily out of developments that have taken place since November 1954. In some cases study has indicated serious weaknesses in the bargaining position of the United States in negotiating with some third countries that have planned all along to negotiate with Japan and with which the United States may consequently wish to carry on negotiations to expand benefits to Japan. In others, countries that had previously no firm plans to negotiate have decided to undertake negotiations.

Hearings were scheduled and opportunity provided for submission of briefs to obtain views and information from interested persons on these negotiations, including views for or against concessions

which the United States might offer on particular products. The listing of an item is for the purpose of gathering information on the possibility of a concession; it does not necessarily mean that a concession will be offered on the product. No concession can be made on a product not included in a published list issued by the Committee.

Public hearings before the Committee for Reciprocity Information (The CRI receives the views of interested persons for the Interdepartmental Committee) began on March 28, 1955, at Washington.

The U. S. Tariff Commission also held public hearings starting on March 28, to receive views and information useful in preparing its "peril-point" report to the President. Views and information received by the Tariff Commission were to be made available to the Committee for Reciprocity Information.

These are the fishery items added on the supplemental list:

Tariff Paragraph	1954 Schedule A Class No.	Brief Description	Present Rate of Duty	Duty Can Be Reduced To
718(a)	0066 600	Prepared or preserved fish, other than anchovies, antipasto, bonito, yellowtail, sardines, smoked pollock, and tuna, if packed in oil or in oil and other substances, valued not over 9 cents per pound including weight of immediate container.	44% ad val.	22% ad val.
	0066 700	Same as above, except valued over 9 cents per pound including weight of immediate container.	30% ad val.	15% ad val.
719(4)	0070 400	Herring, pickled or salted, in bulk or in containers weighing with their contents more than 15 pounds each and containing each more than 10 pounds of herring, net weight.	$\frac{1}{2}\text{¢}$ per lb.	$\frac{1}{4}\text{¢}$ per lb.
720(a)(2)	0075 100	Herring, hard dry-smoked, whole or beheaded but not further advanced.	$\frac{1}{2}\text{¢}$ per lb.	$\frac{5}{16}\text{¢}$ per lb.
720(a)(3)	0075 300	Herring, smoked or kippered, boned.	$1\frac{1}{4}\text{¢}$ per lb.	$\frac{3}{4}\text{¢}$ per lb.
	0075 400	Herring, smoked or kippered, filleted, skinned, split or divided.	$1\frac{1}{4}\text{¢}$ per lb.	1¢ per lb.

Note. Includes breaded fish sticks, cooked or uncooked, containing added oil resulting from the presence of oil in the material in which they were breaded or from the oil in which they were cooked. The Bureau of Customs ruled on June 11, 1954, such products were dutiable under Tariff Paragraph 718 (a) at 30 percent ad valorem when valued over 9 cents per pound including the weight of the immediate container.

## Eighty-Fourth Congress (First Session)

MARCH 1955:

Listed below are public bills and resolutions introduced and referred to committees or passed by the Eighty-Fourth Congress (First Session) and signed by the President that directly or indirectly affect the fisheries and allied industries. Public bills and resolutions are shown in this section when introduced and, if passed, when signed by the President; but also shown from month to month are the more pertinent reports, hearings, or chamber actions on some bills.

ALASKA NET REGULATIONS: The House on March 7 passed without amendment and cleared for the President S. 456, relating to the regulations of fishing nets in Alaska waters. H. R. 249, a similar bill, was tabled.

The President on March 16 signed S. 456, relating to the regulation of fishing nets in Alaskan waters. (Public Law 12.)

### AN ACT

Relating to the regulation of nets in Alaska waters.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the last sentence of section 3 of the Act entitled "An Act for the protection and regulation of the fisheries of Alaska," approved June 26, 1906, as amended (48 U. S. C., sec. 233), is hereby amended to read as follows: "It shall be unlawful to lay or set any seine or net of any kind within one hundred yards of any other seine, net, or other fishing appliance which is being or which has been laid or set in any of the waters of Alaska, or to drive or to construct any trap or any other fixed fishing appliance, except a set gill net, stake gill net, or anchored gill net, within six hundred yards laterally or within one hundred yards endwise of any other trap or fixed fishing appliance."

APPROVED MARCH 16, 1955.

CONSERVATION IN MILITARY RESERVATIONS: H.R. 5442 (Sikes), introduced March 31. A bill to promote effectual planning, development, maintenance, and coordination of wildlife, fish, and game conservation and rehabilitation in military reservations; to the Committee on Armed Services.

INTERIOR DEPT. APPROPRIATIONS: H.R. 5085 (Kirwan), introduced March 21. A bill making appropriations for the Department of the Interior and related agencies (including the Fish and Wildlife Service) for the fiscal year ending June 30, 1956, and for other purposes; to the Committee on Appropriations. Bill

reported out to House March 21 by Committee on Appropriations (H. Rep. 239).

The House on March 24 passed, by a voice vote, H. R. 5085, making appropriations for the Department of the Interior and related agencies for the fiscal year ending June 30, 1956. As reported from the Committee on Appropriations the bill recommends appropriations of \$298,271,246, which amount is \$15,081,810 under the budget estimates and \$3,203,380 less than the 1955 appropriation.

Department of the Interior and Related Agencies Appropriations Bill, 1956, House Report No. 239 (March 21, 1955, 84th Congress, 1st Session), 17 pp., printed. In reporting an appropriation for the Fish and Wildlife Service Investigations of Resources, which includes the Branches of Commercial Fisheries and Biology, the report states:

"The budget estimate of \$3,977,000 is recommended. This is a reduction of \$150,000 below the amounts available for the current fiscal year, which reduction is more than amply compensated by the permanent appropriation for research activities made in the recent Saltonstall-Kennedy Act. A total of \$10,000 is to be used from the funds available under this heading for blackbird control work in the state of New Jersey."

MINIMUM WAGE INCREASE: H. R. 4908 (Ashley), introduced March 15. A bill to amend the Fair Labor Standards Act of 1938 so as to increase the minimum hourly wage from 75 cents to \$1.25; to the Committee on Education and Labor.

Also H. R. 5302 (Granahan), introduced March 29, similar to H. R. 4908.

TROUT HATCHERY IN ARKANSAS: H. R. 4897 (Trimble), introduced March 14. A bill to provide for the establishment of a trout hatchery immediately below Norfolk Dam on Northfork River, Ark., to the Committee on Merchant Marine and Fisheries.

Also S. 1520 (Fulbright), introduced March 22, similar to H. R. 4897.

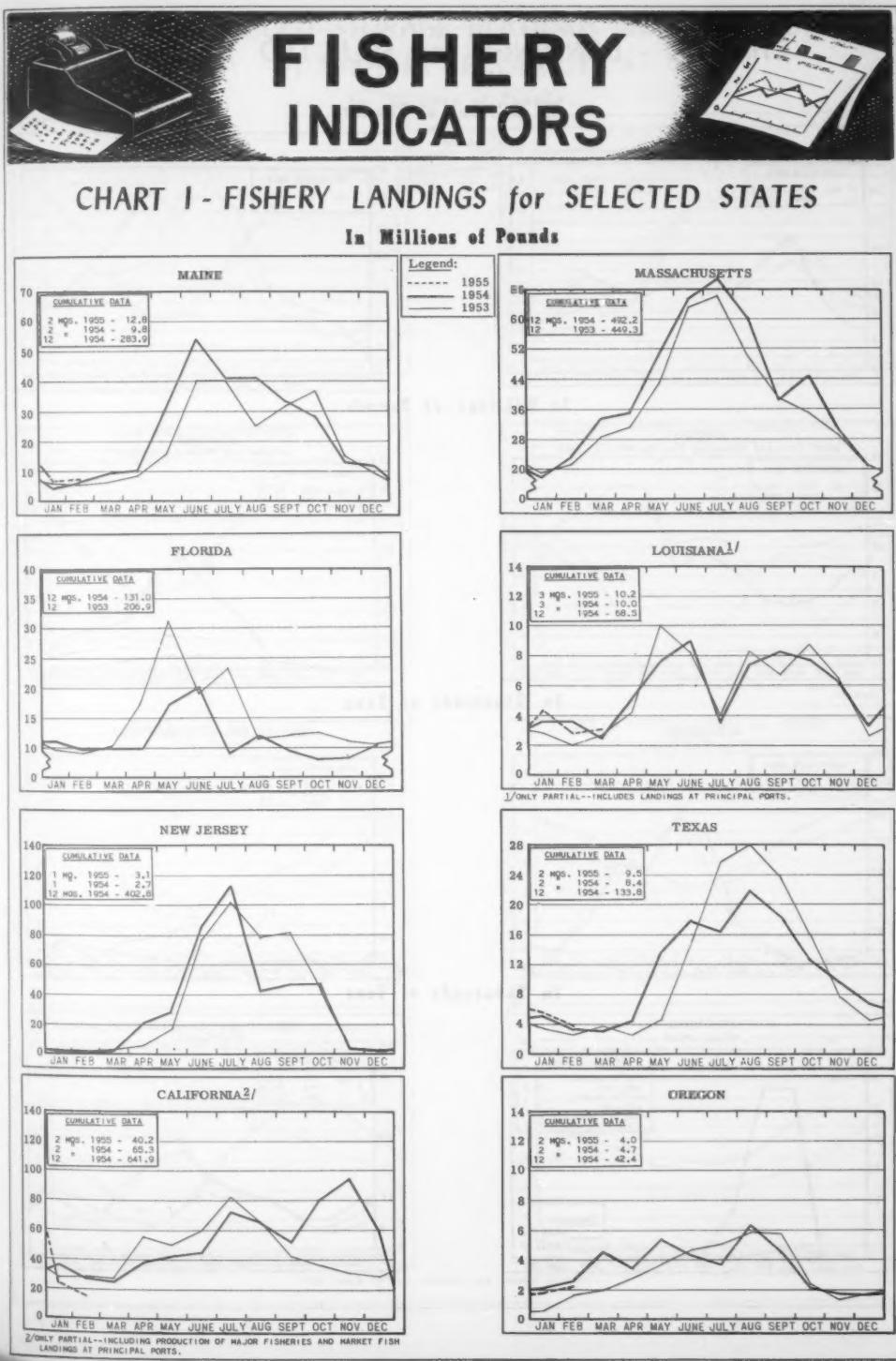
WEATHER STATION IN GULF OF MEXICO: S. 1354 (Eastland), introduced March 8. A bill to provide that one floating ocean station shall be maintained at all times in the Gulf of Mexico to provide storm warnings for States bordering on the Gulf of Mexico; to the Committee on Interstate and Foreign Commerce.

Also H. R. 4809 (Kilgore), introduced March 10, similar to S. 1354.

WATER POLLUTION CONTROL: H. R. 5296 (Blatnik), introduced March 29. A bill to extend and strengthen the Water Pollution Control Act; to the Committee on Public Works.

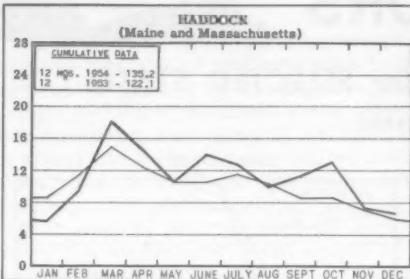
Also H. R. 5369 (Fulton), introduced March 30, similar to H. R. 5296.



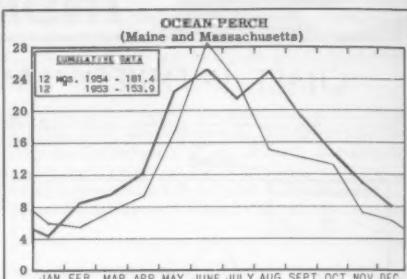


## CHART 2 - LANDINGS for SELECTED FISHERIES

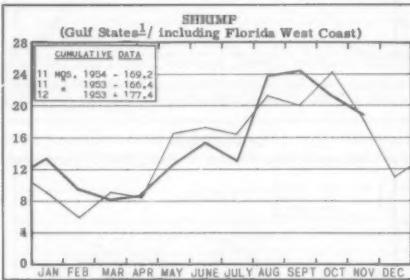
**In Millions of Pounds**



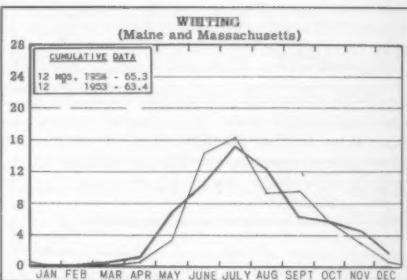
**Legend:**  
— 1955  
— 1954  
— 1953



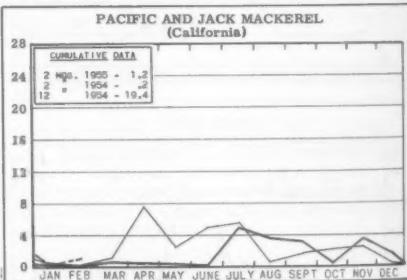
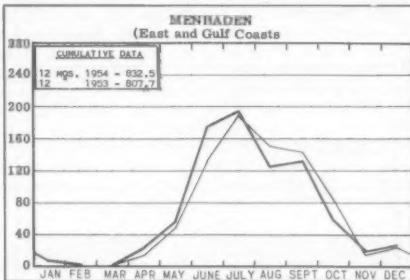
**In Millions of Pounds**



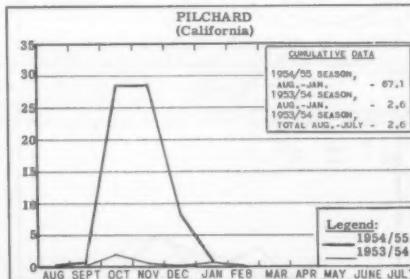
<sup>1</sup>L.A. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.



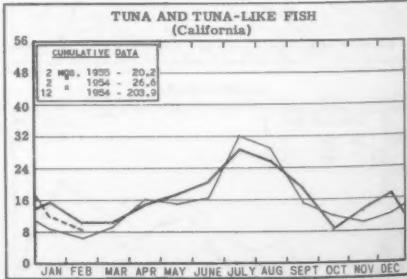
**In Thousands of Tons**



**In Thousands of Tons**

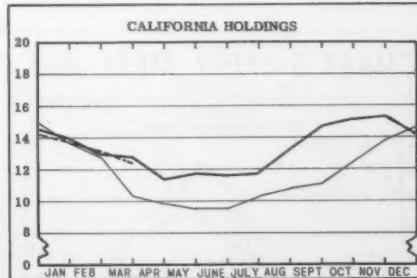
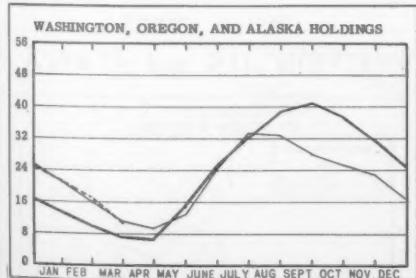
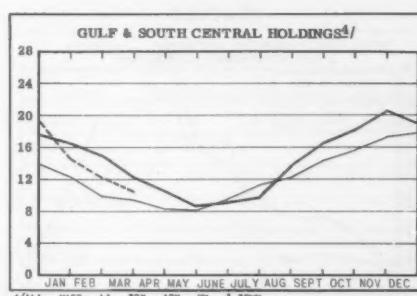
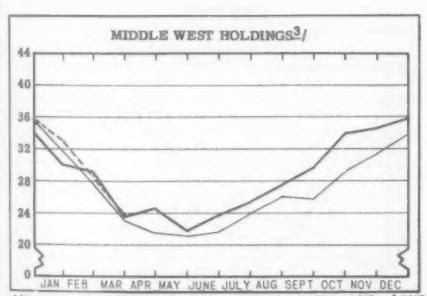
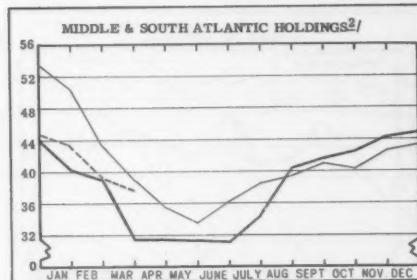
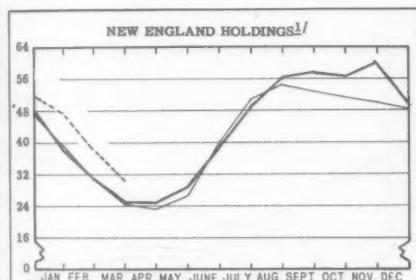
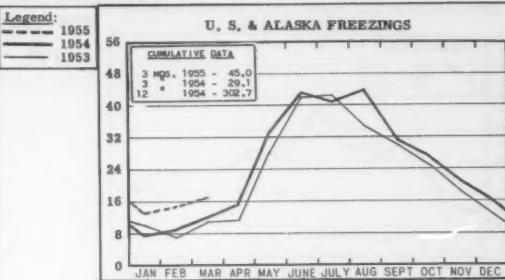
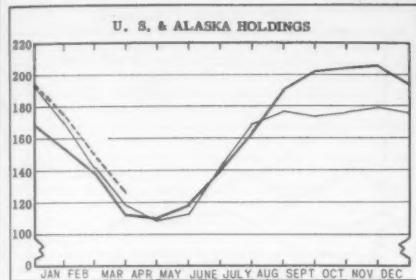


**Legend:**  
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— 1953/54



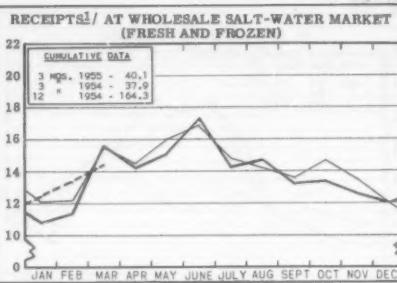
### CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS \*

In Millions of Pounds

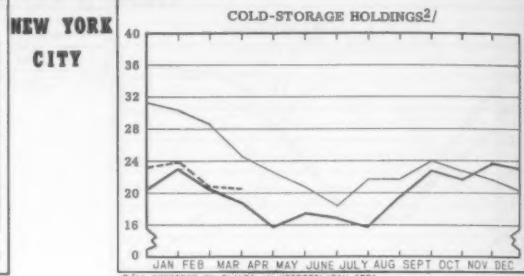


\*Excludes salted, cured, and smoked products.

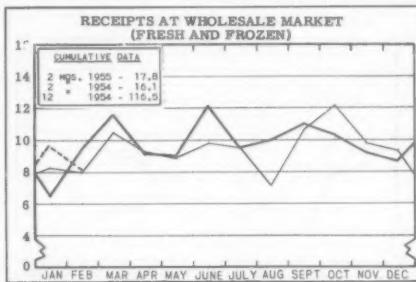
**CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS**  
In Millions of Pound



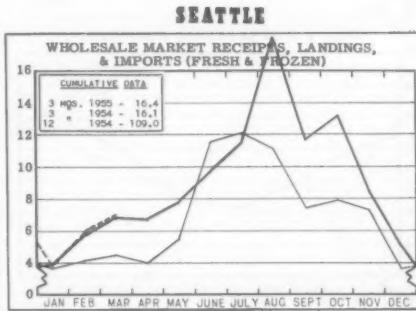
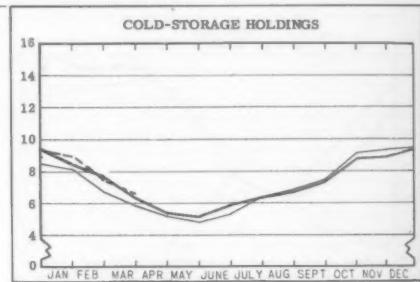
<sup>1</sup>/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.



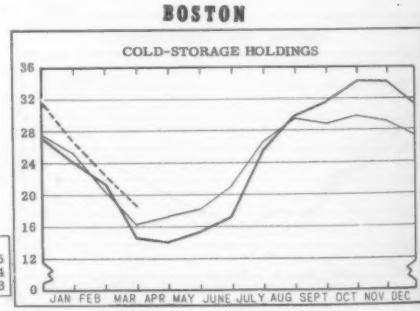
<sup>2</sup>/AS REPORTED BY PLANTS IN METROPOLITAN AREA.



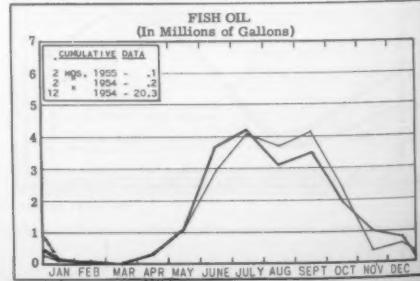
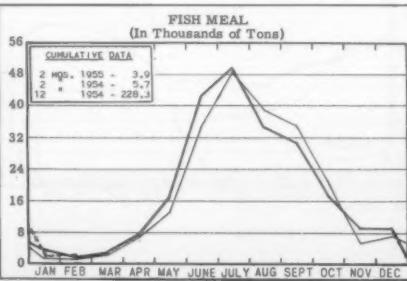
CHICAGO



Legend:  
— 1955  
- - - 1954  
— 1953

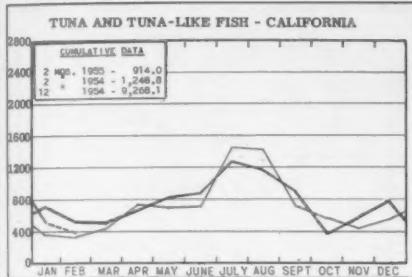


**CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA**



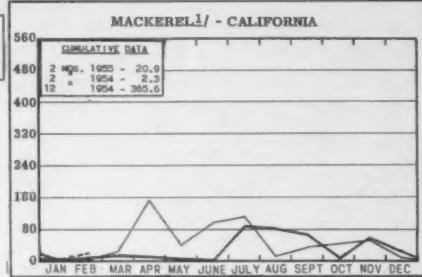
## CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases

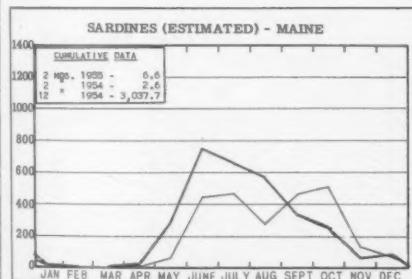
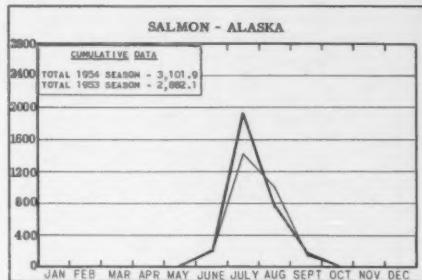
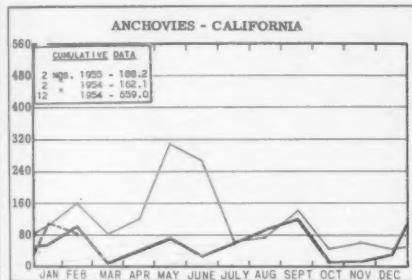


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— 1954  
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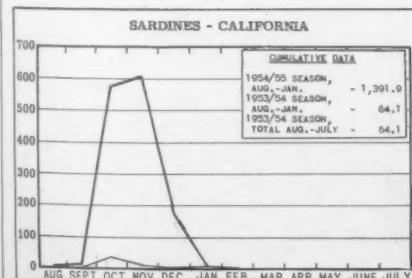


<sup>1/</sup> INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.



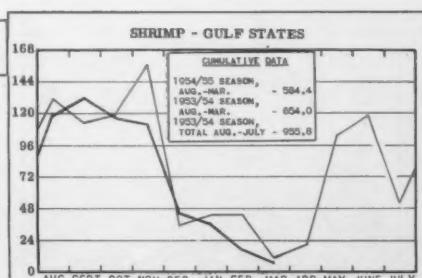
**STANDARD CASES**

Variety	No. Cans	Can Designation	Net Wgt.
SARDINES .....	100	½ drawn	3½ oz.
SHRIMP .....	48	--	5 oz.
TUNA .....	48	No. ½ tuna	6 & 7 oz.
PILCHARDS .....	48	No. 1 oval	15 oz.
SALMON .....	48	1-pound tall	16 oz.
ANCHOVIES .....	48	½ lb.	8 oz.



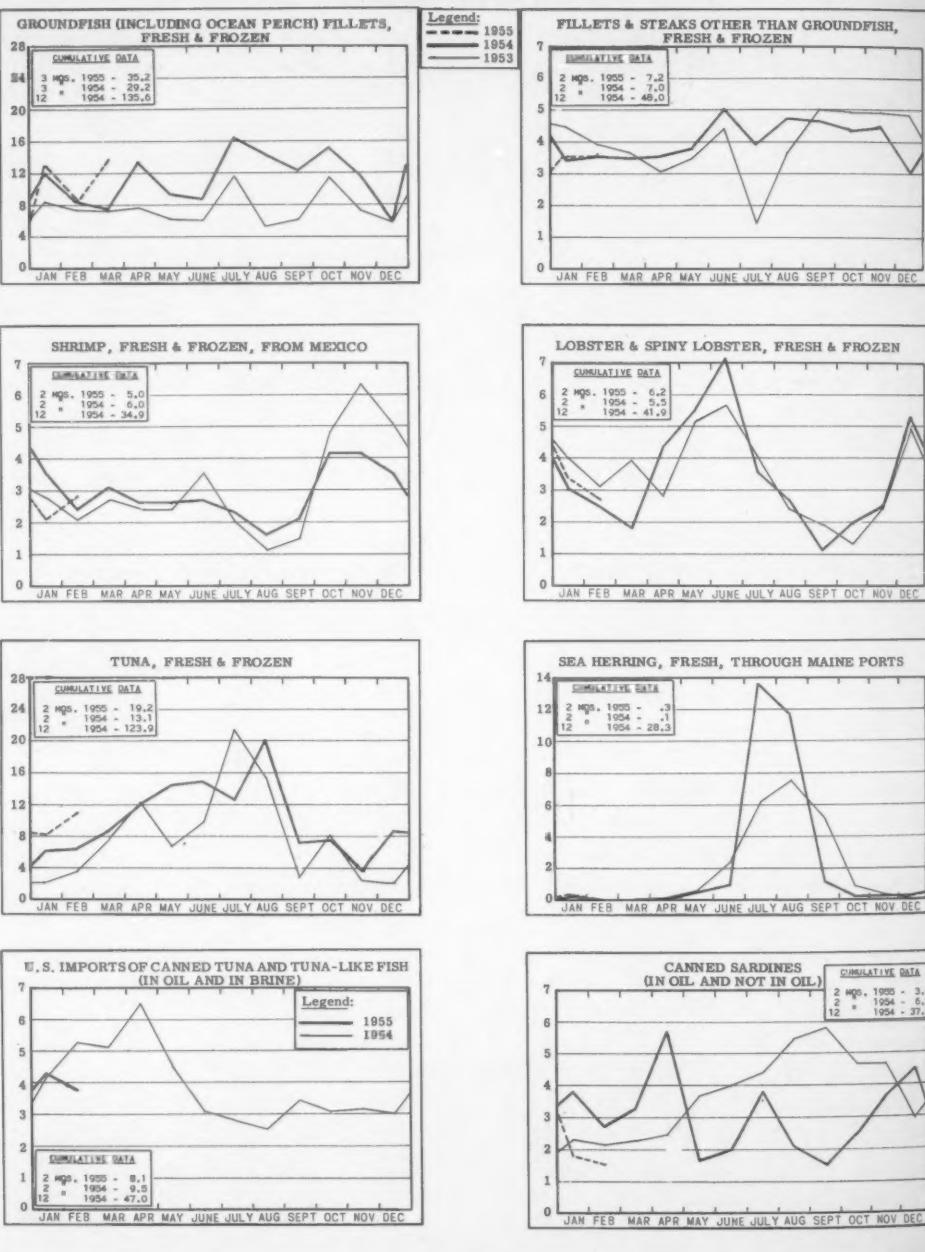
Legend:

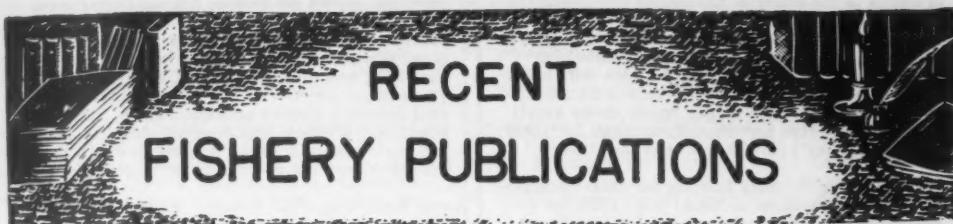
— 1954/55  
— 1953/54



## CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

**In Millions of Pounds**





## FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.  
FL - FISHERY LEAFLETS.  
SSR - FISH - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).  
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-1068	- Mississippi Landings, October 1954, 2 pp.
CFS-1083	- New York Landings, November 1954, 4 pp.
CFS-1087	- Frozen Fish Report, December 1954, 8 pp.
CFS-1088	- Rhode Island Landings, August 1954, 3 pp.
CFS-1094	- Massachusetts Landings, October 1954, 8 pp.
CFS-1095	- Texas Landings, November 1954, 3 pp.
CFS-1096	- Rhode Island Landings, September 1954, 4 pp.
CFS-1097	- Rhode Island Landings, October 1954, 4 pp.
CFS-1099	- Maine Landings, December 1954, 4 pp.
FL - 9	- Available Leaflets on Fisheries--1955, 18 pp.
FL - 421	- United States Foreign Trade in Edible Fishery Products, 1949-53, by Arthur M. Sandberg and Ruth L. Dunavant, 44 pp., October 1954. This leaflet analyzes the foreign trade in edible fishery products of the United States from 1949 through 1953. Included are tables and charts showing the quantity, types of products, value, and origin or destination of the principal fishery products in the foreign trade of the United States.
SSR-Fish. 140	- Burrowing Ability of Juvenile Clams, by John P. Baptist, 14 pp., illus., processed, January 1955.

Annual Report of the Director Fish and Wildlife Service to the Secretary of the Interior, Fiscal Year Ended June 30, 1954 (Reprinted from the Annual Report of the Secretary of the Interior), 34 pp., printed. Summarizes the various activities of the Service. Specifically discussed are: utilization of fishery resources (describes the activities of the Branch of Commercial Fisher-

ies); research in fishery biology (coastal, inland, marine, and shellfish fisheries); Federal aid to state projects for the restoration of fish and wildlife; maintenance of inland fisheries; administration of Alaska fisheries; Pribilof Islands fur-seal industry; river basin development and wildlife needs; international cooperation in conservation (international conservation agreements and technical cooperation); and other activities. Major research projects covered in the report included those directed toward the discovery of latent sources of fish which constitute food resources for the future. Great underfished resources of herring exist in the north Atlantic and west Pacific, of pilchard in the south Atlantic and south Pacific, of tunas in the central Pacific and south Atlantic, of cod in the north Pacific and the Atlantic.

In the central Pacific the results obtained by Service vessels scouting for tuna indicate that expansion of the Hawaiian tuna industry will depend largely on measures to increase the geographical area that the fleet can cover through construction of larger, better-equipped vessels, and improvement of the fishermen's navigational abilities.

New beds of deep-water red shrimp in the Gulf of Mexico were discovered by the Service's exploratory-fishing vessel Oregon. These now appear almost certain to become of commercial importance. The Oregon also made an important discovery of yellowfin tuna in the western Gulf. Exploratory cruises are planned to determine whether the yellowfin resources would support a new commercial fishery.

Research which continued throughout the year on the red tide problem on the west coast of Florida further confirmed earlier theories that river effluents carrying organic nutrients, and the correct combination of temperature and wind conditions produce a suitable environment for rapid reproduction of Gymnodinium brevis, the fish-killing plague.

Major emphasis in the Great Lakes fishery program was put on controlling the sea lamprey through further testing and refining of electrical barriers, completing research studies on lamprey biology, testing larvicides, and continuing a survey of streams tributary to Lake Superior.

At the Service's fishery laboratory at Woods Hole, Mass., one of the most important research

projects is the study of biological effects on the haddock of the regulation of the International Commission for the Northwest Atlantic Fisheries which makes it illegal to fish for haddock on Georges Bank or in the Gulf of Maine with a net having meshes of less than  $4\frac{1}{2}$  inches inside dimension. Use of this larger mesh saves small unmarketable fish and should increase the yield from each year class that enters the fishery.

Part of the Pribilof Islands fur-seal receipts were again available in fiscal year 1954 for equipment and added personnel to enforce the Alaska Game Law. This, together with the excellent cooperation of military authorities, greatly improved the protection of fish and wildlife in the Territory. Enforcement problems are increasing in Alaska because of new roads, the use of surplus military equipment, home-built tundra crawlers, and a new junior-size combination tractor-caterpillar capable of traversing most of the terrain.

Sep. No. 385 - Japanese High-Seas Mothership-Type Drift Gill-Net Salmon Fishery-- 1954.

Sep. No. 395 - Freezing and Cold Storage of Pacific Northwest Fish and Shellfish: Part IV - Storage Characteristics of Four Species of Salmonidae.

Sep. No. 396 - Determination of Cook Drip in Pacific Ocean Perch (*Sebastodes alutus*) and Pacific Oysters (*Ostrea gigas*) by Use of a New Method.  
Tech. Note No. 31 - Weight Range, Proximate Composition, and Thiaminase Content of Fish Taken in Shallow-Water Trawling in Northern Gulf of Mexico.

THE FOLLOWING SERVICE PUBLICATION IS AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

Landings and Prices of Fishery Products, Boston Fish Pier, 1953 (Includes Trends in the Fishing Industry at Boston), by Thomas J. Risoli, 26 pp., processed, January 1955. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Fish marketing trends and conditions in Boston for 1953 are discussed in this publication. Detailed data on landings and ex-vessel prices of fish and shellfish landed at the Boston Fish Pier during 1953 are presented. Statistics are given by months and species and by type of gear, together with comparative data for previous years.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS WASHINGTON 25, D. C.

Alaska Fishery and Fur-Seal Industries, 1953, by Seton H. Thompson, Statistical Digest No. 35, 83 pp., illus., printed, 40 cents, 1955. Detailed reports and statistical tables concerning the operation and yield of the various fishery industries are presented, with added data on certain related matters, particularly the condition of the fishery resources. Under the section on fishery industries, the following subjects are

covered: court decisions; Alaska Department of Fisheries; research; exploratory fishing investigations; administration; management; and general statistics on salmon, herring, halibut shelffish, and miscellaneous fishery products. The second section on the Pribilof Islands fur-seal industry covers administration, fur-seal population studies, and general statistics on the fur seals taken in 1953. A statement is also included on sealing privileges accorded aborigines.

"North American Fish Policy," article, The Progressive Fish-Culturist, vol. 17, no. 1 (January 1955), pp. 45-47, processed (annual subscription \$1.25 domestic, US\$1.65 foreign). Presents the revision of the North American Fish Policy, which was adopted by the American Fisheries Society on September 14, 1954, at its 84th annual meeting in Seattle, Wash. The Policy is divided into seven sections: (I) State, National, and International Relations; (II) Administration of Fisheries; (III) Research; (IV) Management; (V) Multiple Use of Waters; (VI) Adoption of Uniform Common and Scientific Names of Fishes; and (VII) Education and Publicity.

## MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

"Age Composition of the Southern California Catch of Pacific Mackerel for the 1953-54 Season," by John E. Fitch, article, California Fish and Game, vol. 41, no. 1, January 1955, pp. 107-112, printed. California Department of Fish and Game, 926 J Street, Sacramento 14, Calif.

(Alaska) 1953 Annual Report, Report No. 5, 93 pp., illus., printed. Alaska Fisheries Board and Alaska Department of Fisheries, Juneau, Alaska, 1954. Summarizes the activities of the Alaska Fisheries Board and the Alaska Department of Fisheries for 1953. Describes the biological research (Taku River investigation, troll fishery investigations, and black cod research), inspection, predator control, sport fish, and watershed management programs. The role of the salmon hatchery in Alaska is also discussed. The statistical part of the report contains data on the value of canned salmon by species; total salmon pack and number of operating salmon canneries by districts (1944-53); number of salmon taken in 1953 and 1952 by gear, species, and district; quantity and value of fish and shellfish landings by species (1944-53); and quantity and value of fishery products as prepared for market (1944-53). In addition to a financial statement, the report concludes with a discussion of the plans of the Department and its future outlook.

(Bears Bluff Laboratories) Annual Report 1953-1954, Contribution No. 17, 12 pp., illus., printed. (Reprinted from Report of South Carolina Wildlife Resources Department Fiscal Year July 1, 1953-June 30, 1954.) Bears Bluff Laboratories, Wadmalaw Island, S. C., January 1955. The

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activities of the Laboratories are described. Research was conducted on oysters, clams, crabs, shrimp, and salt-water ponds.

(Canada) Trade of Canada, Exports, December 1954 and Twelve Months Ended December 1954, 186 pp., processed, 50 Canadian cents. Dominion Bureau of Statistics, Ottawa, Canada, 1955. Contains exports of Canadian produce from Canada, including fishery products and byproducts.

(Department of the Interior) 1954 Annual Report of the Secretary of the Interior (For the Fiscal Year Ended June 30), 449 p., illus., printed, indexed, \$1.25. U. S. Department of the Interior, Washington, D. C. (For sale by the Superintendent of Documents, Washington 25, D. C.) This publication contains the annual reports of the various agencies of the Department of the Interior, including the Fish and Wildlife Service. Included under Fish and Wildlife Service are summaries of its various activities. Specifically discussed are utilization of fishery resources (describes the activities of the Branch of Commercial Fisheries); research in fishery biology (coastal, inland, marine, and shellfish fisheries); Federal aid to state projects for the restoration of fish and wildlife; maintenance of inland fisheries; administration of Alaska fisheries; Pribilof Islands fur-seal industry; river basin development and wildlife needs; international cooperation in conservation (international conservation agreements and technical cooperation); and other activities.

The Effects of a Late-Summer Drawdown on the Fish Population of Ridge Lake, Coles County, Illinois, by George W. Bennett, 12 pp., printed. (Reprinted from Transactions of the Nineteenth North American Wildlife Conference, March 8, 9, and 10, 1954, pp. 259-270.) Wildlife Management Institute, Wire Building, Washington 5, D. C.

"Exploratory Oceanographic Observations in the Eastern Tropical Pacific, January to March 1953," by Warren S. Wooster and Feenan Jennings, article, California Fish and Game, vol. 41, no. 1, January 1955, pp. 79-90, illus., printed. California Department of Fish and Game, 926 J Street, Sacramento 14, Calif.

"Fish Juices Could Save Ditched Aircrues," article, The South African Shipping News and Fishing Industry Review, vol. IX, no. 12, December 1954, p. 77, printed, single copy 2s. (28 U. S. cents). Describes research being conducted by the Royal Air Force Institute of Aviation Medicine at Farnborough in Southern England on the possibility of air crews who have to bail out over sea prolonging their lives with the consumption of fish juices. Tests were being made off the British, Middle Eastern, and Far Eastern coasts. It will probably be some time, however, before the Institute will be able to decide if fish juices can be seriously considered of value to "ditched" crews. In time they hope to discover, among other things, whether sufficient juice can be extracted from a fish to provide a man with enough liquid nourishment to keep him alive, whether fish juices are injurious or beneficial, the best and most economical method of extracting juice--by crushing

pressing, or cutting, for example--and the degree of sa tiness found in fluids taken from fish of varying types and weights.

Groundfish Fillets (1954), Report to the President on Escape-Clause Investigation No. 25 Under the Provisions of Section 7 of the Trade Agreements Extension Act of 1951, 77 pp., processed. United States Tariff Commission, Washington 25, D. C., May 1954.

Hong Kong Annual Departmental Report by the Director of Agriculture, Fisheries & Forestry (for the Financial Year 1953-54), 89 pp., illus., printed. The Government Printer, Hong Kong, 1954. This publication contains the annual reports of the various divisions of the Department of Agriculture, Fisheries and Forestry. Included in the report of the Fisheries Division is a review of its activities during the year, which were directed mainly to the marine fisheries and the mechanization of the fishing fleet, the fresh-water and oyster fisheries, technical investigations, training of fishermen, advisory and inspection service, and surveys of fishing grounds and the fisheries. The report also describes the Department's fisheries policy and the 1954 Fisheries Exhibition. Tables in the appendix give the number and type of Hong Kong fishing craft and fishermen, landings of the principal varieties of fish marketed by species, and oyster production.

Hong Kong Annual Departmental Report by the Registrar of Cooperative Societies and Director of Marketing (for the Financial Year 1953-54), 43 pp., printed. The Government Printer, Hong Kong, 1954. This report covers the activities of the Department from April 1, 1953, to March 31, 1954. The section on Cooperative Societies discusses education in cooperative activities. Among the subjects discussed in the Fish Marketing Organization section are: legislation, functions of the Organization, quantity and value of fish marketed, fish processing, and education.

Jahresbericht über die Deutsche Fischerei 1953 (Annual Report of the German Fisheries 1953), 327 pp., illus., printed in German. Bundesministerium für Ernährung, Landwirtschaft und Forsten, in cooperation with Mitwirkung des Statistischen Bundesamtes, 72 Neuer Wall, Hamburg 36, West Germany. (Publisher: Mann Bros., Berlin, Germany), October 1954. Presents 1953 statistics for fishery landings and imports in considerable detail as well as the number of vessels, new building, personnel employed, etc. In the section devoted to the main fishing ports of Bremerhaven, Cuxhaven, Hamburg-Altona, and Kiel, details are given of the firms operating trawlers, together with the number operated and the type. The statistics in this book give a clear picture of the advances made by the German fishing industry after World War II.

Largemouth Bass in Ridge Lake, Coles County, Illinois, by George W. Bennett, 64 pp., illus., printed. Bulletin of the Illinois Natural History Survey, vol. 26, article 2, November 1954, pp. 217-276. Department of Registration and Education, Urbana, Ill.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATIONS ISSUING THEM.

Life History of the Striped Bass in Maryland Waters, Supplement Number 3, 2 pp., illus., printed. (Extract from Maryland Tidewater News, vol. 11, no. 9, February 1955.) Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md.

"The Lipids of Fish: 5. The Lipids Remaining in the Flesh of the Haddock After Extraction by Acetone and Ethanol-Ether," by June Olley and J. A. Lovern, article, The Biochemical Journal, vol. 57, no. 4 (August 1954), pp. 610-619, printed, 20s. (US\$2.80) net per issue. Cambridge University Press, London, N.W., 1, England.

"Maritime Salmon Catches Since 1949," by C. J. Kerswill, article, Trade News, vol. 7, no. 6, December 1954, pp. 3-10, illus., printed. Department of Fisheries, Ottawa, Canada. A report on both the commercial landings and the angling catches of Atlantic salmon in the Maritime region for 1949-54. The statistics are also summarized graphically. The author states that "Comparing the 1954 total catches of Atlantic salmon in the Maritime Region with those of the past two years, the commercial landings by weight were higher and almost the same number of fish were caught by anglers. Angling on many rivers was handicapped by unusually high water in 1954 and commercial fishing in some areas was made more difficult than usual by bad weather and fouling of nets. The poorer catches in some areas are not believed to have been caused by fewer salmon in 1954. There is good reason to expect that recovery is taking place from the downward trend in salmon abundance that has been noticeable in the Maritime Region over the past few years."

"New Advances in the Study of Bivalve Larvae," by V. L. Loosanoff, article American Scientist, vol. 42, no. 4, October 1954, pp. 607-624, illus., printed, single copy 50 cents. American Scientist, 54 Hillhouse Avenue, New Haven, Conn. This article is concerned with recent developments and improvements in the methods for obtaining eggs and sperm of bivalve mollusks and for growing the larvae in laboratory cultures. It also discusses briefly certain results that have been achieved because of the successful use of these methods, many of which were developed during the past few years. Methods of maintaining ripe mollusks during the winter months and of growing organisms under varying conditions of food and medium concentrations are fully described.

Norwegian Fishing News, vol. 2, no. 1, 1955, 28 pp., illus., printed, annual subscription 15 Norwegian kroner (US\$2.10). Norwegian Fishing News Ltd., Bergen, Norway. A new bimonthly magazine containing articles on all phases of the Norwegian fishery industries.

Norwegian Joint Stock Banks, Financial Review, vol. 29, no. 3, July 1954, 12 pp., illus., printed. Norwegian Bankers Bureau of Statistics and Information, Oslo, Norway. Includes, among others, discussions of the Norwegian herring meal and herring oil industry, the production and prices of whale oil, economic developments, and foreign trade in fish and fishery byproducts.

"Notes on the Feeding Habits of Subsurface Yellowfin and Bigeye Tunas of the Eastern Tropical Pacific Ocean," by Rolf Juhl, article, California Fish and Game, vol. 41, no. 1, January 1955, pp. 99-101, printed. California Department of Fish and Game, 926 J Street, Sacramento 14, Calif.

Operation of the Trade Agreements Program, Sixth Report, July 1952-June 1953, 260 pp., processed. United States Tariff Commission, Washington 25, D.C., 1954. This is the sixth report of the Tariff Commission on the operation of the trade agreements program, covering the period from July 1952 through June 1953. During the period covered by the report, the United States concluded no new trade agreements. It did, however, conclude a supplemental agreement with Venezuela, revising the bilateral trade agreement entered into by the two countries in 1939. The report discusses the concessions that the United States granted and obtained in the supplemental negotiations with Venezuela, as well as the changes that were made in the general provisions of the agreement with that country. It also covers important developments respecting the General Agreement on Tariffs and Trade. Like the earlier reports, the sixth report also discusses such matters as changes in tariffs, exchange controls, and quantitative restrictions on imports by contracting parties to the General Agreement; changes in tariffs, exchange controls, and quantitative restriction on imports by countries with which the United States has bilateral trade agreements and actions of the United States relating to its trade agreements program.

The sixth report was prepared in conformity with Executive Order 10082 of October 5, 1949, which directs the Tariff Commission to submit to the President and to the Congress at least once each year a factual report on this subject. The first report in the series (issued in 1948) covered the period from June 1934 through April 1948; the second report (issued in 1949) covered the period from May 1948 to April 1949; the third report (issued in 1951) covered the period from April 1949 through June 1950; the fourth report (issued in 1952) covered the period from July 1950 through June 1951; and the fifth report (issued in 1953) covered the period from July 1951 through June 1952.

Outcome or Current Status of Applications for Escape-Clause Investigations, by the United States Tariff Commission, as of August 23, 1954, 30 pp., processed. United States Tariff Commission, Washington 25, D.C., September 1954.

Pacific Marine Fisheries Commission Seventh Annual Report of the Pacific Marine Fisheries Commission for the Year 1954 (To the Congress of the United States and to the Governors and Legislatures of Washington, Oregon, and California), 20 pp., printed. Pacific Marine Fisheries Commission, Portland, Ore. Describes briefly the activities of the Commission and contains a short resume of the one meeting of the Commission during 1954. Also included are summaries of reports submitted by the participating agencies on the research conducted in 1954 on the following marine species and fisheries: ocean salmon troll fishery, otter trawl fishery, sablefish (black cod), and albacore tuna. In addition, contains a financial report of the Commission.

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Peruvian Fishery Supplement to the Peruvian Times, 20 pp., illus., printed, December 24, 1954. Peruvian Times, Lima, Peru. Contains a review of the Peruvian fishing industry and a translation of the proceedings of and agreements reached at the Second Tripartite Conference on the Maritime Resources of the South Pacific held in Lima on December 1-4, 1954. Also includes statistics on production of fish in Peru, and Peruvian fish exports by countries and by products.

"A Preliminary Report on the Spawning of the West North Atlantic Bluefin Tuna (*Thunnus thynnus*) in the Straits of Florida," by Luis Rene Rivas (Contribution No. 130 from the Marine Laboratory, University of Miami), article, Bulletin of Marine Science of the Gulf and Caribbean, vol. 4, no. 4 (December 1954), pp. 302-322, illus., printed, \$2 per issue. University of Miami Press, Coral Gables, Fla. Evidence indicating that the western north Atlantic bluefin tuna spawns in the Straits of Florida during May and early June is presented. Such evidence includes the occurrence of ripe and recently spawned adult fish simultaneously with what may be fertilized eggs and larvae. Further evidence includes the occurrence of juveniles and young in the vicinity of the spawning grounds. It is inferred that the large adult fish spawning in the Straits of Florida are the same which are found in northern waters during summer. The discovery of spawning grounds in the western Atlantic also suggests that the American and European bluefin tuna represent separate independent units.

Prepared Crab Products Growing in Popularity, by W. A. Van Engel, Contribution No. 51, 8 pp., illus., processed. Virginia Fisheries Laboratory, Gloucester Point, Va., 1954. (Also in Frosted Food Field, April 1954, pp. 19-20.) Describes how the fluctuations in the blue crab supply in Chesapeake Bay and the need for a completely satisfactory method of freezing crab meat affect the full development of frozen crab products.

Review of Kenya Fisheries, 1953, by Hugh Copley, 44 pp., illus., printed. The Government Printer, Nairobi, Kenya, 1954. Reviews the Kenya fisheries for 1953, with special reference to the river fisheries, hatchery work, a fish-culture farm, oyster research, and marine fisheries. The report on the marine fisheries discusses production, prices, distribution and marketing, and exploratory and experimental work. It describes a study of markets; collection and disposal of shell in various forms; catching, preparation, and sale of turtles, crustacea, and beche-de-mer; and crawfish breeding.

Rockfish for the Fisherman, by Robert S. Bailey, Contribution No. 50, 6 pp., illus., processed. Virginia Fisheries Laboratory, Gloucester Point, Va., 1954. (Also in Virginia Wildlife, vol. XV, No. 3, March 1954.) Describes the striped bass or rockfish sport fishery in Virginia waters, and gives a brief description of the life history of the species.

"South African Pilchard Oil;" "2. Concentrates of Highly Unsaturated Fatty Acids and Alcohols Derived From South African Pilchard Oil," by H. M. Silk, H. H. Septon, and H. H. Hahn, pp. 574-577; "3. The Fatty Acid Composition of South African Pilchard Oil," by H. M. Silk and H. H. Hahn, illus., pp. 577-582; "4. The Isolation and Structure of a Hexadecatetraenoic Acid from South African Pilchard Oil," by H. M. Silk, and H. H. Hahn, illus., pp. 582-587; articles, The Biochemical Journal, vol. 57, no. 4 (August 1954), printed, 20s. (US\$2.80) net per issue Cambridge University Press, London, N. W. 1, England.

The Story of FAO, by Gove Hambridge, 315 pp., illus., printed, \$6.50. D. Van Nostrand Company, 250 Fourth Ave., Inc., New York 3, N. Y. The author, who is North American Regional Representative of the Food and Agriculture Organization of the United Nations, in this book describes the birth, background, activities, and purpose of FAO, the first of the new United Nations specialized agencies to be established. This book also is the first commercially-published book about any of the specialized agencies of the United Nations. The story of FAO is the story of humanity. The author, in my opinion, has succeeded in making it just that.

Part I discusses the background to FAO. The first chapter through a typical fictional character, Abu Libda, and his family, takes you to Egypt--the villages, the homes of the people, and the fields where they work. The peasants have far too little land to make a decent livelihood, and the chapter tells about the revolutionary and very hopeful movement now under way to carry out national land reform. As a contrast, the next chapter takes you to a farm owned by another fictional character, Jim Barton, in the northeast part of Iowa, and in effect portrays the story of agricultural development throughout the western world. The third chapter, "Narrow the Gap," describes this contrasting situation in broader terms around the world--the contrasts in food supplies, quality of diets, health, length of life, and all the rest.

Part II, consisting of four chapters tells about the genesis and development of FAO. Included are the activities of certain scientific and economic groups in the League of Nations who helped to develop a realization of the extent of undernourishment and incredibly poor living conditions; of the development of knowledge about the contribution food makes to health and length of life; of the postwar depression and unsalable "surpluses" of food in some countries while many people even in those countries were hungry. It tells about the background of the international organization established by the wartime partners to deal with these problems--FAO--and gives a round-up of the earlier activities of missionaries, foundations, and other groups in the kind of work known as technical assistance or technical cooperation. There is a lot of detail to be found in this book about all the early history of FAO which is not found elsewhere.

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Part III deals with technical cooperation in the Near East and Africa, Far East, Latin America, and Europe from the viewpoint of regional projects and work with individual countries. Under this section detailed descriptions of the projects being carried out by FAO in countries around the world and the efforts of these countries to improve their services in agriculture, nutrition, fisheries, forestry, and statistics are included. In order not to clutter up the text with footnotes, the author has eliminated them and included the additional information in an appendix under the proper page number together with some other reference data.

In summary, the early chapters include an account of the basic studies and the fact-gathering work of FAO in agriculture, nutrition, forestry, and fisheries. The last half tells the story of technical cooperation or technical assistance. Fisheries have not been forgotten in this book since they play an important part in supplying food to many countries, and the part they play is adequately covered throughout the book.

The author very aptly points up the value of FAO when he wrote: "Future historians may come to regard this swift growth of an idea--the idea that is the foundation of FAO--as one of the most important characteristic developments of this time. Hundreds, perhaps thousands, of scientists and other experts from many different countries are now scattered all over the world, pushing the frontiers of knowledge and its practical application further outward and helping to effect the innumerable adjustments in age-old institutions and ways that are needed to make new advances possible. Other thousands of young people from lands that have been thought of as backward are attending universities, colleges, and technical schools abroad and returning to work as experts in their own countries...." this is FAO.

The book's value as a reference work is assured by its adequate index. The book is not an FAO publication, and all royalties go to FAO.

--J. Pileggi

Thirteenth Annual Report of the Atlantic States Marine Fisheries Commission (to the Congress of the United States and to the Governors and Legislators of the Fifteen Compacting States), 55 pp., printed. Atlantic States Marine Fisheries Commission, 22 West First Street, Mount Vernon, N. Y., December 1954. In this annual report the Commission reports progress on fishery research projects initiated and carried on by the Commission and on its behalf by the U. S. Fish and Wildlife Service. Under the North Atlantic Section of the report are included discussions of projects dealing with lobsters, haddock, clams, ocean perch, shad, yellowtail flounder, Atlantic salmon, sea scallops, whiting, Maine herring, fluke, freezing fish in the round at sea, reconstruction of the Service's Woods Hole laboratory, cooperative striped bass program, exploratory tuna fishing, catch statistics, fishery

college in Massachusetts, dams in Connecticut River, dragging operations, industrial fishing, and the technological program. Under the Middle Atlantic Section there is a discussion of projects dealing with shad, gray sea trout (weakfish), sea scallops, yellowtail flounder, hard clams, whiting, Delaware River anadromous fisheries management program, cooperative striped bass program, catch statistics, offshore waste disposal, dragging operations, sport-fishing surveys, menhaden studies, and a statement requesting Saltonstall Act funds for state research. The Chesapeake Bay Section includes discussions of projects concerned with croaker, blue crab, shad, menhaden, clams, Chesapeake Bay Institute, cooperative striped bass program, sport-fishing surveys, Potomac River oyster laws, joint legislature committee on migratory finfish, and a resolution opposing the proposal to discharge mine waste waters. Under the South Atlantic Section a discussion of the following programs is included: shrimp, shad, bluefin tuna, cooperative offshore research program, license fees and severance taxes, catch statistics, cooperative striped bass program, gear development, out-of-state boats in inland waters, sale of fish by anglers, and pollution. Another section of the report deals with the certification of shellfish; catch statistics; Northwest Atlantic fisheries; Amendments No. 1 and No. 2 to the Atlantic States Marine Fisheries Compact--Common Fisheries and Inland Waters; Federal Legislation, Fisherman's Protective Act of 1954; fisheries research; legislation needed; activity of the fishing industry; statement on "social" legislation in the fisheries; sale of fish by anglers; and licenses for saltwater anglers.

"Tuna Longlining: Results of a Cruise to the Eastern Tropical Pacific Ocean," by Robert C. Wilson and Bell M. Shimada, article, California Fish and Game, vol. 41, no. 1, January 1955, pp. 91-98, illus., printed. California Department of Fish and Game, 926 J Street, Sacramento 14, Calif.

The Unpredictable Blue Crab Fishery, by J. L. McHugh and E. C. Ladd, Contribution No. 44, 3 pp., illus., printed. Virginia Fisheries Laboratory, Gloucester Point, Va. (Also in National Fisheries Yearbook, 1953.) Gives the early history of the blue crab fishery, and describes fluctuations in abundance and management of the resource. The approach that has been outlined in this paper represents, in the opinion of the authors, the minimum program necessary to solve the most pressing problem in blue crab management--the effect of fishing on the resource.

"The Unsaturated Fatty Acids of the Alga Chlorella," by R. F. Paschke and D. H. Wheeler, article, The Journal of the American Oil Chemist, vol. 31, no. 3, March 1954, pp. 81-85, illus., printed. The American Oil Chemists' Society, 35 E. Wacker Drive, Chicago 1, Ill. (Also Paper No. 145, Journal Series, Research Laboratories, General Mills Inc., Minneapolis, Minn.) The purpose of this paper is to explain the composition of the unsaturated fatty acids of the fresh-water algae Chlorella pyrenoidosa grown in pure culture in pilot-plant quantities.



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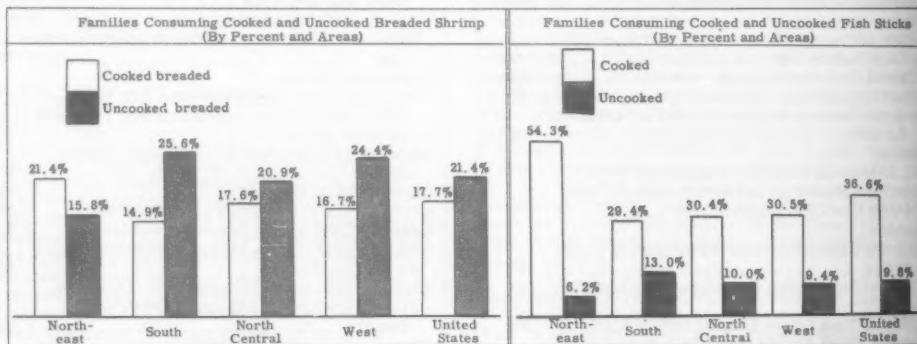
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## CONSUMER PREFERENCES FOR BREADED SHRIMP AND FISH STICKS

Fishery Leaflet 422, Consumer Preferences for Breaded Shrimp and Fish Sticks, is the summary of a November 1954 survey of household consumers in all areas of the country sponsored by the Fish and Wildlife Service to determine the consumption of breaded shrimp and fish sticks. The services of a private research firm were used to mail out 2,000 questionnaires on the subject. The information obtained from the survey is presented graphically.

Of 1,797 housewives responding to questions concerning meals and snacks served in their homes between November 1953 and the same month last year, nearly 37 percent stated they had used precooked fish sticks, while about 10 percent said they had purchased uncooked sticks and fried them in their own kitchens.



Most of these homemakers said their families preferred the largest size fish sticks, and the 12-ounce package. Most also indicated that their families liked the fish sticks moderately seasoned. The favorite time for fish sticks was meal time as compared with between-meal snack periods.

Breaded shrimp showed a somewhat different pattern in the survey. More than 21 percent of the housewives responding, nationwide, stated they had purchased this item uncooked, while about 18 percent said they had bought the breaded shrimp in precooked form. Consumers showed a preference, in most cases, for medium-sized shrimp cooked to a light golden brown.

Free copies of Fishery Leaflet 422 are available from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

